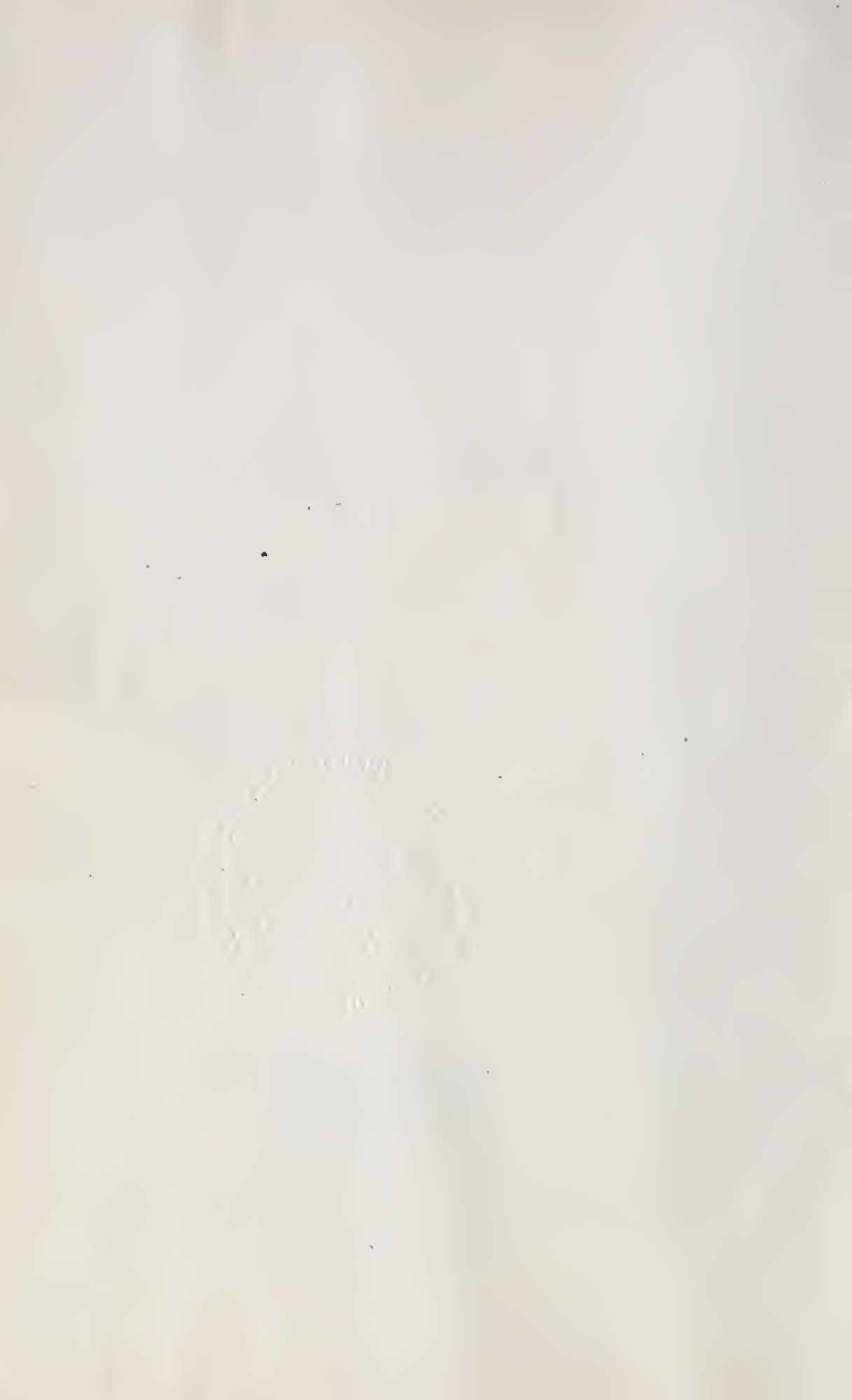


REPORT
OF THE
DEPARTMENT OF MINES,
NOVA SCOTIA,
FOR THE YEAR 1884.




HALIFAX, N. S.
COMMISSIONER OF PUBLIC WORKS AND MINES,
QUEEN'S PRINTER.
1885.



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DEPARTMENT OF MINES.

REPORT FOR THE YEAR 1884.

*To His Honor Matthew H. Richey, Esq., Lieutenant-Governor of the
Province of Nova Scotia, &c., &c., &c.*

MAY IT PLEASE YOUR HONOR,—

I respectfully present herewith to Your Honor the Annual Report of the Inspector of Mines, together with statistical information, compiled by him from official and other returns made to the Department of Mines during the year 1884.

I remain

Your Honor's obedt. servant,

CHARLES E. CHURCH,

Commissioner of Public Works and Mines.

HALIFAX, February 16, 1885.

REPORT

ON THE

MINES OF NOVA SCOTIA,

By EDWIN GILPIN, JR., A.M., F.G.S., F.R.S.C.,

INSPECTOR OF MINES.

(Member of the North of England Institute of Mining Engineers.)

OFFICE OF INSPECTOR OF MINES,

HALIFAX, February 16, 1885.

TO THE HONORABLE

CHARLES E. CHURCH, M. P. P., M. E. C.,

Commissioner of Public Works and Mines:

SIR,—I beg leave to submit the following report on the Mines of Nova Scotia during the year 1884.

The following summary shows, so far as I have been able to learn, the mineral production of Nova Scotia during the year 1884, compared with that of the previous year:

		1883.	1884.
Gold.....	Ounces.....	15,446	16,079
Iron Ore.....	Tons.....	52,410	54,885
Manganese Ore.....	".....	150	302
Copper.....	".....	60	110
Lead.....	".....		100
Antimony.....	".....		600
Coal raised.....	".....	1,422,553	1,389,295
*Gypsum.....	".....	144,668	111,068
*Building Stone.....	".....	181	780
Coke made.....	".....	44,189	40,085
Limestone.....	".....	26,477	25,567
*Grindstones, etc.....	".....	155	2,200

* Amounts exported, Home Consumption unknown.

Through the kindness of the Collectors of Customs at the various ports of the Province I am enabled to give further details under this head at the end of the report.

In addition to a detailed notice of the operations at each mine, and the usual statistical tables, I submit a summary of the minerals exported, not paying royalty to your honorable Government.

I also beg leave to enclose the reports of W. Madden, Jr., Esq., Deputy Inspector of Mines for the District of Cumberland, Colchester and Pictou Counties; and of Patrick Neville, Esq., Deputy Inspector of Mines for the Island of Cape Breton.

These gentlemen have been occupied in paying regular visits to the mines in their respective districts, and in making enquiries into accidents, complaints, etc. With regard to ventilation, one of the most important points in connection the working of coal mines, I would here remark that in Nova Scotia proper it is produced in most of the mines by fans, and generally is sufficient in quantity and properly circulated. In Cape Breton, fans are in operation only at two collieries, the rest are ventilated by furnaces, which are not adapted for the shallow mines of the Island. When the Cape Breton collieries were first opened their furnaces provided sufficient air, but now that the workings are greatly extended the results are not equally satisfactory.

At the Spring Hill and Victoria collieries mechanical ventilators of an inexpensive and efficient character have given good results; and the introduction of fans of the same type, or of the Guibal pattern, as at the Sydney mines, would be found beneficial in the other Cape Breton collieries. In several cases during the past season Mr. Neville found that this highly important matter had been seriously neglected. It was immediately put right on his drawing attention to it; but it is not the intention of the law that a coal mine should be operated with imperfect ventilation until an official inspection is made. The responsibility of maintaining a proper and sufficient amount of air rests on the management. I have instructed Mr. Neville in future to report any such violation of the ventilation clauses of the Act, with a view to having the law at once enforced.

After the close of the meeting of the British Association for the advancement of Science, at Montreal, a party of the members visited this Province on the invitation of your honorable Government. They saw various points of interest, including the Cumberland Coal Field, the Londonderry Iron Mines, the Gypsum deposits, and the Gold Mines at Montagu. It is to be regretted that the time at their disposal did not permit of their trip being extended to Pictou and Cape Breton, but they were very much pleased with what they saw, and the favorable impressions they carried away with them will not fail to prove of benefit to the Province.

COAL TRADE.

The total sales for the year 1884 amounted to 1,261,650 tons, made up of 945,518 tons of round and 316,132 tons of slack coal, as compared with 1,297,523 tons during the year 1883, comprising 1,016,418 tons of round and 281,105 tons of slack coal. This would show a decrease of 70,900 tons in the round coal sales, and an increase of 35,027 tons in the slack coal sales; making a total decrease of 35,873 tons.

The increase in the sale of slack coal (which does not pay royalty) is worthy of notice, and the following table will show that its value for economic purposes is being appreciated :

Total sales of slack coal, year 1884.....	316,132 tons.
" 1883.....	281,105 "
" 1882.....	247,100 "
" 1881.....	209,011 "
" 1880.....	177,977 "
" 1879.....	113,719 "
" 1878.....	131,528 "
" 1877.....	109,155 "

At present about 85,000 tons of the slack are burned into coke. The following are the principal customers using slack for other purposes during the past year :

United States	51,519 tons.
Quebec.....	46,353 "
New Brunswick	38,061 "
P. E. Island.....	27,532 "
Nova Scotia	75,000 "

This grade of coal now forms the bulk of our exports of fuel to the United States; and I believe it is used there chiefly for mixing with anthracite smalls for boiler furnaces. Most of that sold in the Dominion is for steam raising in stationary boilers, and some, especially in Prince Edward Island, for lime burning. It is in many cases an excellent fuel for raising steam, and its introduction at the boilers of our collieries has given results equal to that of round coal, at a diminished cost.

The following are the most noticeable points in the coal trade :

The home sales were 493,050 tons compared with 471,327 tons in 1883, and 458,592 tons in 1882.

The Province of Quebec took 396,782 tons against 410,605 tons during the preceding year.

The sales to New Brunswick were 158,420 tons, a decrease of 9,320 tons.

Newfoundland took 86,216 tons as compared with 61,678 tons during the preceding year.

The sales to Prince Edward Island show an increase of 2,311 tons being 50,399 tons.

The West India sales have decreased from 31,860 tons in 1883 to 9,595 tons during the past year.

The sales to the United States were 64,515 tons (of which only 12,996 tons were round coal), the smallest recorded since the year 1850, except during 1879, when they were 51,641 tons.

CUMBERLAND COUNTY.

The total sales of this county amounted to 258,405 tons against 222,347 tons in 1883. This increase is due to the greatly augmented output of the Spring Hill Mines; the Chignecto colliery having fallen off in its production.

The home sales were 59,502 tons against 43,731 tons during the preceding year.

The sales to New Brunswick were 93,724 tons against 127,751 tons in 1883.

The province of Quebec took 104,243 as compared with 46,483 tons in 1883, and 58,561 tons in 1882.

COLLIERIES.

Boston Coal Mining Company.—In the beginning of the year a few tons of coal were taken from this colliery for local sales.

Chignecto.—During the past year, the second set of balances were worked, and the east levels extended. On the west side work was discontinued after the second balance was finished. A dip slant was started near the bottom on a south-west course, and driven down several hundred feet and bords broken off. The mine was idle during great part of the season, and in the fall a few men were put in to take out coal for country sale. The out put was 11,644 tons against 23,395 tons raised during the previous year.

Joggins.—The operations at this mine have been confined to the new slope, which is fully opened out. A small furnace has been put up. The rotary screen at this colliery has continued to work well, and the nut coal is said to find favor in the market. Shortly before the close of the year the colliery office was burnt down, and the pit plan destroyed. The benefit of the sections of the Act which require

duplicates of colliery plans was well shown, for the department have been enabled to furnish them with a plan for temporary use. The out put was 25,034 tons against 26,098 tons during the preceding year.

Milner.—During the past season Mr. John Hurley has taken out a few tons of coal for local sales.

Minudie.—Work has been steadily carried on at this Mine during the past season. The coal is of good quality and mined by the long wall system in fair sizes. In the fall work was interrupted for a short time through the roof closing the air way, but the stoppage was not of any moment. The output was 10,023 tons against 4,451 tons in 1883.

Maccan.—Mr. William Patrick opened the seams formerly worked on the Lawson area, on a property adjoining to the west. A pit was sunk on a seam about two feet thick, of good quality; and a slope driven down 75 feet on another overlying seam of about the same thickness. These beds are separated by about 130 feet of strata, and dip S. 45° E. at an angle of about 30°. Heapsteads and houses have been built, and a syphon put in to drain the slope. The coal resembles that opened at the Lawrence Colliery on the River Hebert, and is of good quality, and in demand for local sales. The returns show that 94 tons were raised.

Spring Hill.—The operations at this extensive colliery have been pushed with vigor, and the output again shows an increase, being 232,481 tons against 193,151 tons in 1883. The sinking on the new seam has been continued. A fan has been put up at the west slope, and works on the "blow down" principle. Arrangements have been made to concentrate the pumping plant at the west slope, where a pair of Allison pumps, having 30 inch steam and 14 inch water cylinders, will raise the water from the east, west and north mines through 12 inch wrought iron columns.

The coking qualities of the coal in the newer openings at these mines have been found satisfactory, and a considerable tonnage has been coked at Londonderry for the blast furnaces.

Salt Springs.—Mr. Pitblado and others opened a seam of coal near the Salt Springs Station, five miles east of Spring Hill Junction. The seam is about three feet thick, and is apparently of fair quality, as shown by the following analysis:—

	Slow Coking.	Fast Coking.
Moisture	1.47	1.47
Volatile combustible matter	33.46	34.70
Fixed carbon.....	55.87	54.63
Ash	9.20	9.20
	<hr/>	<hr/>
	100.00	100.00
Sulphur.....	.79	.79

It is not possible to say at present if this seam and those found in its immediate vicinity can be identified with any of those worked at Spring Hill; but operations here may throw some light on the structure of the eastern end of the Cumberland coal field.

Scotia.—Operations were continued at this mine on the usual scale. In the spring Mr. George Wilson sunk a new slope, 95 feet deep, to the westward of the old mine, referred to in my last report, leaving a barrier. Later on this barrier was broken through, and as the fire appeared to have died out some pillars were taken from the old mine. The returns show a production of 609 tons.

PICTOU COUNTY.

The total sales were 464,181 tons compared with 461,809 tons in 1883.

The home sales were 262,780 tons against 260,980 tons during the preceding year.

The sales to Quebec were 139,934 tons against 145,527 tons in 1883.

New Brunswick took 25,233 tons against 7,402 tons in 1883.

Prince Edward Island took 31,343 tons compared with 38,622 tons during 1883, and 41,463 tons during 1882.

COLLIERIES.

Acadia.—The regular operations at this colliery present no new features of interest. The new lift is being successfully worked, the slope haulage being now about 2,350 feet. Preparations are being made to replace the present pump by one larger and better adapted to meet the extension of the workings. The output of the colliery was 115,451 tons against 115,028 tons in 1883.

Albion Mines.—The output from these collieries was 201,557 tons compared with 168,231 tons during the preceding year. The fan formerly at the Foord pit was removed to the McGregor workings, and should provide ample ventilation for some time to come. Two boilers have been put up to drive it. The workings in the third seam have been regularly carried on. There were 25,681 tons of coke made during the year.

Intercolonial.—During the past year a compound 180 horse power engine was placed in the 1,700 feet level to assist the main haulage engine. Two Lancashire boilers were put up to increase the steam power, and the boilers housed in with an iron roof. In March the lamp house was burned, and all the safety lamps destroyed. A new fire proof house has been erected in its place. The main slopes were extended and the new lift is fairly under way.

The No. 4 slope and the pit in the second seam were not utilized during the summer. The out put was 120,656 tons as compared with 147,111 tons in 1883.

Vale.—During the past season the extraction of the pillars in the 1800 foot level of the McBean seam has been carried on successfully. The slope is being extended 700 feet for a new lift. The coal continues to be of good quality and to preserve its thickness. The slope has been re-timbered, and the track lowered.

In the Greener seam the slope has been extended to a distance of about 1000 feet, and levels turned away. The coal has thickened to seven feet, and is stated to be of very good quality, and will prove an important addition to the coal resources of the county. The branch from the company's railway to the mouth of the slope is ready for rail laying, and it is expected that the mine will be in full operation in the spring. The out put was 73,529 tons, against 74,656 tons in 1883.

During the spring Mr. John McNeil did a little work on the Kirby and Merigomish areas.

Mr. A. McG. Barton prospected his coal property lying to the south and west of the Vale area, and traced some of the Vale seams over a large portion of it. His work is considered to have shown the presence of a seam, hitherto unknown, lying above the six feet or Greener seam now being opened on the Vale area.

CAPE BRETON COUNTY.

The total sales during the past year from Cape Breton County were 539,064 tons compared with 612,614 tons in 1883.

The home sales showed a slight increase, being 179,768 tons against 166,262 tons during the preceding year.

New Brunswick took 39,463 tons, an increase of about 7,000 tons over the sales of the preceding year.

The Newfoundland sales were 83,143 tons against 58,342 tons sent there during 1883.

Prince Edward Island took 19,056 tons, nearly double the amount sold there during the preceding year.

The sales to Quebec were 152,605 tons against 218,595 tons in 1883, and 198,892 tons in 1882.

The sales to the West Indies show a falling off of 21,872 tons, being only 8,909 tons.

The sales to the United States were 62,565 tons against 93,433 tons during the previous year.

The sales to other points were inconsiderable.

COLLIERIES.

Sydney.—The workings at this colliery have been regularly extended in pursuance of the plans laid down at their start. The system of electrical signaling between the engine house and the pit bottom has been found to work satisfactorily. Near the top of the north slant an automatic switch has been found useful, and could in some cases be advantageously copied. The full boxes coming up close it, and it re-opens, so that if the rake breaks away at the bank head it will pass into a short blind slant. When the empty rake is going down, the switch is kept closed by the bank head man until it has passed. The returns show that 149,378 tons of coal were raised, against 162,866 tons during the preceding year. There were 81 tons of coke made.

Victoria.—The work of opening out this mine has been satisfactorily carried on. The railway has been re-ballasted and laid with 50 lb. steel rails, and substantial stone culverts have been put in. The new pier is arranged to have gravity tracks for both full and empty cars. There is a depth of 30 feet of water at the end of the pier, and it is arranged that three steamers can be bunkered at the same time. There have been 14,112 tons of coal raised.

Barasois.—A slope has been started about $2\frac{1}{2}$ miles from the Low Point Mine, on a seam considered to be the extension of the Lingan coal. The seam dips N. 30° E. at an angle of 16° , and presents 6 feet of clean bright coal. It is proposed in the spring to open out and complete the winning, and to extend the railway from the Low Point Colliery to enable this mine to ship at the South Bar.

Lingan.—At this mine work has been confined principally to the low lift in the sea area. Here the coal presents the following section:—

	Ft.	In.
Top coal roof	1	3
Coal	1	8
Band	0	5
Coal	5	6
Coal		8
	<hr/>	
	9	6

The levels have been driven in about 20 chains and rooms broken off. The workings in the sea area are very dry, and a portable plunger pump readily removes all the water. All the available pillars in the No. 4 level were taken out. The out-put was 23,404 tons compared with 16,482 tons during the year 1883.

Reserve.—During the past season this colliery raised 96,114 tons, against 110,456 tons in 1883. The workings have been extended from both slopes. At the request of adjoining proprietors a survey was made of the main slope and bottom level by Mr. H. R. McKenzie,

C. E., and the accuracy of the pit plans confirmed. At a point 14 chains down the slope a dip slope has been started to cut the Emery seam, and it is expected that it will soon reach it. Wooden water pipes have been successfully used for pump columns in this mine, and their cheapness should recommend their adoption for short lifts.

International.—The working faces at this mine have been extended on their usual course. The coal is now weighed at the bank head as it is raised. The introduction of an underground locomotive on the new engine road, and the adoption of some form of mechanical ventilation, are being considered. The out-put was 87,216 tons as compared with 99,018 tons during the year 1883.

Little Glace Bay.—A few tons of coal were taken from the Hub seam during the past season. Operations in the Sterling pit have been continued as usual in the rise coal. The proposed concentration of the shipping of this colliery and of the Caledonia Mines at the Glace Bay Harbor has been carried out, and I believe works well. The out-put was 36,138 tons against 75,848 tons during the preceding year.

Bridgeport.—During the summer Mr. Henry Mitchell re-opened the workings of the General Mining Association on their area on the south side of Lingan Basin. The following history of this mine, taken from Mr. Brown's work on the Coal Fields of Cape Breton, will be of interest.

The mine was first opened in 1830 by a level driven from the shore along the outcrop of the seam now known as the Phalen. Pits were sunk at intervals of about a quarter of a mile, and the coal was raised by horse gins. At the face of the cliff the seam presented the following section:—

	Ft.	In.
Coal	3	0
Shale	0	5
Coal	5	3
	<hr/>	
	8	8

As the workings were advanced from the shore the shale increased to a thickness of twenty-eight feet at a distance of half a mile. Beyond this point it thinned rapidly, and at the Last pit, now being worked, the coal bed shows as follows:—

	Ft.	In.
Coal	3	0
Stone	9	0
Coal	6	0

A bore hole put down about 300 yards to the dip of the level showed the shale to be only fourteen inches thick. (In the Reserve Mine, working the same seam, a short distance to the south, the stone parting is of insignificant thickness.)

At first the coal was lightered out to vessels anchored in the open bay, but in 1833 a railway was built along the sand bar to Lingan Harbor. The Bridgeport is a good domestic fuel, and valuable as a gas coal, yielding nearly 10,000 cubic feet of gas per ton.

Mr. Mitchell has connected his pit with the International Company's railway, put up houses, etc., and shipped 3,115 tons of coal. The coal looks well, and is apparently similar to the Reserve coal, the qualities of which are well known. Mr. Brown estimates that the property contains 12,600,000 tons of coal in the Phalen seam, of which amount the General Mining Association extracted about 175,000 tons.

Caledonia.—During the past season the railway to the Glace Bay Harbor was completed, and three shoots built. The old railway to Port Caledonia has been dismantled. The extraction of pillars has been successfully continued in the rise coal. The out-put was 69,461 tons against 51,500 tons in 1883.

Ontario.—In the summer enough water was taken out to permit work being carried on in the second lift by Messrs. J. and J. J. McDonald. The out-put was 5,890 tons.

Block House.—During the summer a good deal of coal was taken from the deeps, the out-put being 23,668 tons. Operations were confined to the pillars, and present no new features of interest.

Gowrie.—Work has been carried on vigorously at this mine during the past season. The main levels have been continued, and rooms broken off. The out-put was 89,384 tons against 73,290 tons in 1883.

At the instance of parties owning an adjoining area a survey was made by Mr. McKenzie to see if any trespass had been made. The result of the survey confirmed the accuracy of the pit plans.

MISCELLANEOUS.

Some more prospecting work was done on the "Anthracite" coal at McAdam's Lake, near Sydney.

At Beech Hill, near the Renfrew Gold Mines, some work was done on a small seam of coal of an anthracitic character.

Discoveries of coal were reported at Upper Economy, and at Oxford Station on the Intercolonial Railway.

No work was done at the McBert Mine beyond a little prospecting. The coal opened in 1883 by a slope, as referred to in my last report, would appear from the following analysis, made by me, to be of fair quality:—

	Fast Coking.
Hygroscopic moisture	1.594
Volatile combustible matter	33.188
Fixed carbon	58.206
Ash	7.012
	<hr/>
	100.00
Sulphur	2.648

DEPUTY INSPECTORS' REPORTS.

DISTRICT OF PICTOU, COLCHESTER AND CUMBERLAND.

WESTVILLE, PICTOU Co.

Dec. 31st, 1884.

E. GILPIN, ESQ.,

Inspector of Mines :

DEAR SIR,—I beg leave herewith to submit the following report of my work for the past year as Deputy Inspector of Mines for the District of Pictou, Colchester and Cumberland.

VALE COLLIERY.

I made eleven official inspections of this mine, namely: on January 30, February 22, March 24, April 24, May 9, June 11, August 1, September 16, October 24, November 19, December 27. On all my inspections I found the air good, and every care manifested in the working of the mine. Considerable care and expense have to be bestowed by this company on the roof of the slope to keep it in good order. On some of my visits I found that gas had been given off in the goaf. The management promptly complied with the law in putting on a shot firer.

During the past year they have sunk the McBean slope a further distance of 400 feet. The roof still continues bad, but the coal maintains its height and quality, and thus far no faults have been met in the coal bed.

Greener Seam.—The slope on this seam, with the necessary travelling ways and pipe slope, has been extended a distance of eleven hundred feet, and levels driven east and west a distance of about three chains, and a Cameron pump placed in the bottom of the slope, which discharges the water up to the surface. A small furnace is being built, which will be used temporarily, I am informed, until a fan be erected. I am pleased to be able to say that during the operation of opening up this seam there has not been an accident of any nature whatever; not even a box ran away during all the sinking.

HALIFAX COAL COMPANY.

Slopes No. 1 & 2.—I officially inspected those slopes 12 times during the year, namely: Jan. 24, Feb. 18, March 13, April 15, May 30, June 19, July 31, Aug. 14, Sept. 13, Oct. 17, Nov. 10, Dec. 17, and carefully travelled through the mine, visiting the working faces, airways, inlets,

and outlets. Found the air on every occasion satisfactory. During the year this company have opened a new lift to the dip, and have extended their levels and drove up plane ways.

McGregor Pit.—I visited this pit 14 times during the year, namely: Jan. 12 and 17, Feb. 18, March 20, April 16, May 5, June 17, July 30, Aug. 13, Sept. 15, Oct. 16, Nov. 11 and 14, Dec. 16; and would say that this seam of coal requires great care in operating it as the coal is of a gaseous nature and evolves considerable quantities of gas, but thus far during the past year no one has been burned or any accident occurred through gas.

The air has been sufficient during the past year, but the management have now erected a fan of the largest dimensions of any in the Province, the working of which I have no doubt will greatly increase the ventilation. I found the law in all respects fully complied with on behalf of the management, who on their part exercise every care to compel their workmen to do likewise. On several occasions safety lamps have been damaged either by accident or carelessness, and too much attention cannot be paid to any infringement of this kind in a mine where safety lamps are used.

ACADIA COLLIERY.

I have inspected this mine 13 times during the year, namely: on Jan. 28, Feb. 21, March 10, March 26, April 22, May 29, June 25, July 28, August 26, Sept. 23, October 28, Nov. 25 and December 15, and on each occasion I thoroughly inspected travelling-ways, air-courses, and working faces, and found that the management had an adequate quantity of air traversing through the mine. I also inspected so far as practicable the waste workings.

In my last report I made reference to a new lift as having been driven. So far as possible the coal has been extracted from the pillars in the old lift, and the underground plant has now been transferred to the new lift, and full operations commenced upon it.

INTERCOLONIAL COAL COMPANY.

I have officially inspected this mine 17 times during the year, namely: Jan. 19, February 15 and 19, March 17, April 18, May 6, June 13 and 25, July 29, August 30, Sept. 22, Oct. 20, Nov. 12, 24, 25 and 29, Dec. 29, and as in the preceding mines examined air ways and working faces of the mine and tested the volume of air per minute. On each occasion I found matters in this respect very satisfactory. This company has not resumed work this year in the second seam beyond keeping the water out and the air in circulation. The No. 4 slope is in the same situation. In the old slopes, Nos. 1 and 2 in general, they have been extracting the pillars, and have successfully taken them out from No. 1 side, and have now transferred the underground plant to their new lower lift, which has been developed to enable them to begin full operations upon it. In my report of last

year I referred to the area of up-cast shaft having been enlarged. The management have in consequence had less difficulty with gas than in former years.

CUMBERLAND COUNTY, SPRING HILL MINES.

I have inspected these mines 11 times during the year, namely: Jan. 8 and 9, March 6 and 7, April 23, 24 and 25, May 12, 13 and 14, June 4 and 5, July 5, 7 and 8, Aug. 5, Sept. 2 and 6, Oct. 10, Nov. 5 and 6, December 4.

I have found matters at this mine in a satisfactory condition, the air sufficient and the law complied with. A winning stone drift has been driven from the west side of west slope in the new lift to west side of east slope. Mr. Hall has erected a "blow down" fan at the west slope in addition to the one mentioned last year as working on the north slope. A large portion of the air from this fan is directed into the east side of the east slope, which formerly had natural ventilation only. During the year they have sunk the west slope down a distance of 568 feet, and have transferred the underground plant to this new lift, and are now actively operating upon it.

CHIGNECTO MINE.

I have been at this mine 11 times during the year, namely: on January 12, March 4, April 9, May 16, June 6, July 3, Aug. 4, Sept. 5, Oct. 9, Nov. 4, Dec. 3. In January during my inspection I traversed the workings of this mine, and tested the volume of air, which I found satisfactory, the ventilation being only natural. In May the management had completed a new air way, which was attended with beneficial results. During the summer the mine was idle, except keeping the water out and the air circulating. Some repairs were made during the idle time, such as replacing timber and cleaning up the pit, and it is now in good order. In December, 3 or 4 men were at work extracting coal chiefly for country sales.

JOGGINS MINES.

I have visited this mine 9 times during the year, namely: January 11, April 7, May 15, July 4, Aug. 4, Sept. 4, Oct. 8, Nov. 4, Dec. 2.

Some time previous to my visit in April they had stopped the old slope, and have since been working at the new slope. During the year the ventilation, which is only natural, being somewhat slack, the management have materially assisted it in building a small furnace and cupola.

BOSTON MINING CO.

In January 11th there was a small quantity of coal being taken out of this mine for local sales, and on my visit in March work was suspended altogether, and has remained so ever since.

MILNER MINE.

I visited this mine 7 times during the year. A man named John Hurley has been extracting coal from this area chiefly for local sales—from some time in April up to the present time.

SCOTIA MINE.

I have visited this mine 6 times during the year. The operations have been carried on on a small scale; in fact work was suspended for a large portion of the year. A considerable amount of trouble has been experienced on account of the fire in the goaf, so much so that they were forced to open up a new slope. In October I found a few men at work, and the mine looked satisfactory, but in December, on my last visit, I learned that they had driven the new slope into the workings of the old one and had met with a large quantity of damp, but which had in a short time cleared itself. I went through the opening thus made and travelled to the old slope that had been built off when on fire, and found that the fire had to all appearances been damped out, and that Michael Dunn, who has the management of the mine, was extracting the pillars from the old slope.

MINUDIE.

I visited this mine 9 times during the year, namely: Jan. 10, April 8, May 5, July 3, Aug. 2, Sept. 5, Oct. 8, Nov. 3, Dec. 1, and on each of my visits I inspected the mine, and matters appeared satisfactory. A rotary screen has been erected which works well. The long-wall system adopted in this mine appears to suit this seam, as it enables them to extract a large per centage of the coal.

The Debert Mine, spoken of in my last report, has not been in operation during the year excepting some prospecting. A seam of coal near Salt Springs Station, Cumberland Co., has been opened by Clark, Clish & Co. It presents at the opening a thickness of two feet, and increases as it goes to the dip, and at my last visit, on Nov. 7, it had reached a thickness of three feet two inches. The management are erecting machinery, and sinking a slope on it. On their area there are visible indications of four seams of coal, distinct from the one that is being operated upon.

The foregoing is a condensed summary of the visits made by me during the past season. I have also appended herewith a tabular statement of the volume of air in feet per minute circulating in the different collieries, as well as a condensed summary of accidents, fatal and otherwise, which occurred during the past season.

Table shewing the Quantities of Air in cubic feet per minute, as measured by me in the Cumberland and Pictou Collieries, during the year 1884.

COLLIERY.	MINE.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Intercolonial Coal Co.	Slopes.	97,560	97,000	98,200	96,400	90,200	91,000	100,000	98,000	89,000	90,500	97,700	90,200
	Nos. 1 & 2.	Idle	during	the	entire	year.							
	Scott Pit..	Idle	during	the	entire	year.							
	Slope No. 4.												
McGregor Pit— shaft..	North side.	25,000	21,000	23,000	24,000	22,620	24,127	15,000	15,300	18,306	21,100	18,955	13,570
	South side.	19,000	13,300	14,000	16,000	17,691	14,192	15,600	14,000	16,066	17,200	12,238	20,172
	No. 1	22,500	21,700	22,720	24,720	21,750	21,850	20,880	21,600	16,506	24,750	24,000	26,250
	No. 2	23,760	22,500	23,400	22,520	20,520	20,520	21,000	21,000	17,200	20,560	20,100	23,200
Douglas Seam— slopes..	1 Slope ...	54,700	54,000	56,000	56,230	65,600	64,600	66,300	59,640	64,400	63,843	65,700	64,600
	1 Slope ...	50,000	47,500	54,000	55,000	53,000	40,000		40,600	50,000	59,000	60,000	65,000
	1 Slope ...	9,000	9,700	13,000	11,550	11,100	12,000	Idle.	10,500	9,000	9,400	Idle.	Idle.
	1 Slope ...	15,000		21,000	27,200	24,300	18,400	23,600	17,300	19,000	20,000	26,300	28,000
Spr'g Hill { Mines.	1 Slope ...	25,000		26,000	32,200	30,100	29,000	27,776	39,400	29,000	31,000	31,931	31,000
	1 Slope ...	19,000		17,500	28,000	26,700	28,000	30,535	26,000	30,000	41,168	36,500	38,300
	1 Slope ...			12,000	9,000	11,700	12,100				Idle.	Idle.	Idle.
	1 Slope ...	18,000		20,000	21,600	24,000	12,250	13,000	Idle.	Idle.	Idle.	Idle.	23,000
Cumberland Co. { Chignecto	1 Slope ...	6,000			6,325	7,000	Idle.	5,400	3,430	4,280	4,300	4,700	5,200
	1 Slope ...	3,000			1,300	Idle.	Idle.	Idle.	Idle.	Idle.	1,700		2,000
	1 Slope ...	8,000		Idle.	10,880	11,000	11,550	12,200	13,000	10,240	14,820	13,550	13,100
	1 Slope ...	Idle.		Idle.	.460	Idle.	Idle.	.400	.340	.300	.450	.470	.400

I remain, yours truly,

W. MADDEN, JR.,
Deputy Inspector of Mines.

CAPE BRETON.

BRIDGEPORT, C. B.,

January 3rd, 1885.

E. GILPIN, ESQ.,

Inspector of Mines:

DEAR SIR,—I beg leave to submit the following report on my work as Deputy Inspector of Mines in the Island of Cape Breton.

Sydney Mines.—I have visited this mine ten times during the past year. There is no perceivable change in the underground workings at this mine. Coal is mined, levels and deeps advanced in their usual way. Two miners were injured in their bords by pieces of coal and stone falling on them, also there were two men injured on the surface by the bursting of a locomotive fire box. I enclose you a table showing cause of these accidents, and of all other accidents that occurred in this district for the past year, also tables showing number and dates of visits and amount of air circulating at each visit.

Victoria Mines.—I have visited this mine ten times. The levels on both sides of the slopes have been extended considerably, and headways driven to the rise and back balance placed therein. The engine house and bank have been completed, and the coals are drawn from the slopes by the new engine.

Barrasois Mines.—This mine is situated about half way between the Victoria and Lingan Mines. Work commenced there this summer, and a slope is being driven from the surface through the roof above the coal in the direction of the dip about one hundred feet, where it connects with the seam. The seam is six feet thick, and appears to be a very good quality of coal.

Lingan Mines.—I have made eleven visits to this mine. The working here was chiefly confined to the lower lift, the levels have been driven, and a number of bords broken off. A larger cupola has been built to replace the one that was burned last September.

International Mines.—I have visited this colliery nine times. There has not been much change in the workings at this mine except the drawing of pillars above the line of the upper levels and the splitting of some of the pillars on the second lift.

Reserve Mines.—I have made nine visits here during the past season. The levels in this mine have been extended, headways driven, and bords broken off. A drift is in the course of being

driven from the present seam to connect with the Emery seam that lies below it. The drift is now down about five hundred feet. The Manager says he will strike the coal after extending it four hundred feet further. A young man named Foreman Stubbart and a younger brother had charge of a bord in the mine when the accident occurred causing the death of the former.

Caledonia Mines.—I visited this mine nine times. The underground workings here were carried on in their usual way. The extraction of pillars was carried on very satisfactory, they took nearly all the coal out of them.

Sterling Mines.—I visited this colliery seven times. The coal that was shipped from the mine during the past season was taken from bords already broken off, which have been well timbered and put in good order.

Ontario Mines.—I visited this mine seven times the past year. The little coal that was drawn from this mine during the past season was mined in the second lift on the north side of the slope. The management there failed to get the water out of the dip workings, they have taken up the rails and have drawn up the water pipes. The water has risen as high as the lift the men worked in this season, however before it rose the workings were well timbered.

Block House Mine.—I visited this mine five times. The coal that was shipped here during the past season was taken from the pillars, except a small portion from the deeps.

Gowrie Mines.—I visited this colliery eight times. The western levels were driven a considerable distance and bords broken off. A continuation of the travelling road referred to in last year's report has been extended two hundred yards down to the main level. There have been two over windings of the cage here this season, one in September and the other in November, the cage was caught and held successfully both times at the pulley wheels by the patent detaching hooks. There were no men riding at either time.

You will observe by the tables of air that there is a great difference in the number of cubic feet circulating per minute in a mine, at one visit more than at another. The cause of this is, that when a pit is idle the fires in the furnace are generally neglected, and my record of air circulating is smaller than when they are working. In conclusion I beg to draw your consideration to one thing, that is boys and inexperienced men being given working places in pits. It often happens that a young man from the country starts to work as a loader with a miner for a summer. In the fall, when the work ceases, he returns to his home and comes back the next spring with a loader of his own to one of the mines, and gets work as a miner with his loader, and then gets charge of a working place. The result is this inexperienced miner and his loader make dust of the coal, and are not capable of taking care of themselves. I would suggest that a law be passed not

to allow any person to get charge of any working or leading place in a pit unless he has had three years' experience.

Old Bridgeport Mines.—I have made two visits to this colliery. The shaft is about one hundred and twenty feet deep. It was cleaned out this season. There is a water level from it about $\frac{3}{4}$ of a mile to the sea shore. A headway has been driven westwardly from the pit bottom, and boards broken off right and left. The coal is hoisted to the surface by a small engine and tubs. The management intend driving a travelling road this winter, and putting the mine in good order. A railroad has been completed on the surface, connecting with the International Rail Road.

I am not aware of any other points in connection with the mines in my district that I need refer to.

Number and Date of Visits made by Deputy Inspector to Mines in Cape Breton for the year ending December 31st, 1884.

Mines Visited.	No. of Visits.	DATE OF VISITS.											
		Jan.	Feb.	March.	April.	May.	June.	July.	August.	Sept.	Oct.	Nov.	Dec.
Sydney Mines	10	23	.....	27	25	20	14	19	27	23	8	.....	11
Lingan	11	.....	19	26	17	16	12	18	15	12	30	28	15
Victoria	10	.....	20	26	24	.....	13	23	29	24	31	29	17
Barrasôis	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	15
International	9	16	.....	7	17	24	16	17	18	10	10	.....	10
Reserve	9	25	.....	.....	13	10	21	16	.....	9	7, 24	.....	6
Caledonia	9	.....	.....	5	16	12	10	22	22	13	15	24	3
Sterling	7	15	.....	5	.....	10	11	22	21	15	16	27	4
Ontario	7	.....	.....	.....	.....	23	18	24	14	19	13	25	10
Block House	5	19	.....	15	.....	14	17	10	.....	25	27	.....	13
Gowrie	8	19	.....	15	15	14	17	11	30	26	27	.....	13
Old Bridgeport	2	.....	.....	.....	.....	26	.....	.....	.....	.....	25	.....	.....

*Report of the Number of cubic feet of Air passing through Mines in Cape Breton for the year ending December 31st, 1884,
as measured by me during my official visits.*

	Jan.	Feb.	March.	April.	May.	June.	July.	August.	Sept.	Oct.	Nov.	Dec.
Sydney Mines.....	Idle.	.....	50,320	56,210	54,668	66,560	48,800	52,260	55,500	55,700	.....	64,000
Lingan.....	Idle.	18,000	17,640	.....	26,480	24,000	23,480	18,600	20,000	22,550	23,000	25,300
Victoria.....	10,000	10,200	10,000	15,000	.....	7,560	9,900	10,092	15,000	14,210	.....	15,400
Reserve.....	Idle.	Idle.	.....	.....	30,830	33,000	29,010	22,000	31,300	30,000	.....	23,800
International.....	.....	Idle.	Idle.	20,250	32,600	37,000	36,730	33,000	38,000	36,700	.....	15,000
Gowrie.....	.....	.....	.....	10,000	22,500	27,000	26,000	26,660	27,000	27,500	.....	28,000
Caledonia.....	.....	.....	.....	19,802	33,655	31,500	36,000	36,389	38,130	39,370	.....	15,000
Sterling.....	.....	.....	.....	.....	21,004	12,830	.....	19,000	19,000	20,000	15,000	16,500
Block House.....	.....	.....	.....	.....	25,831	25,000	24,000	.....	25,500	.....	.....	.....
Old Bridgeport.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Ontario.....	.....	.....	.....	.....	.....	10,000	7,900	9,000	8,000	8,000	.....	.....

I beg to remain, yours truly,

P. NEVILLE,

Deputy Inspector of Mines,

GOLD.

The returns show that 118,087 days' labor were performed, and 25,147 tons of quartz were extracted and crushed, yielding 16,079 oz., 14 dwts., 10 grains of gold, during the year 1884.

The result of the past year's work again shows an increase in the yield of gold of 632 ounces over the preceding year.

The average yield was 12 dwts., 18 grains per ton of quartz, etc., crushed; this is 1 dwt., 21 grains higher than the average for 1883, and is partly due to the lessened amount of low grade ore crushed in Sherbrooke.

The following mines have worked steadily during the past year, viz.: the Gallagher, Darr's Hill, Brunswick, Oxford and Empress, and have made satisfactory returns. Other mines are getting under way with good promise of steady operations during 1885, among which may be mentioned the Bluenose mine, Montagu, Leipsigate, Rawdon, and Fifteen Mile Stream which it is hoped will yield a return proportionate to its reputation for richness.

Several large lots of low grade ore have been profitably mined, among them may be named 9,799 tons at Salmon River, yielding at the rate of 6 dwts., 20 grains per ton; and 1,679 tons at Renfrew, yielding at the rate of 6 dwts., 18 grains per ton.

The richest yield the returns show is 2,212 oz., 8 dwts. from 913 tons of quartz crushed by the Gallagher Gold Mining Company, being an average of 2 oz., 8 dwts., 10 grains to the ton.

In view of the steady production now maintained by the principal mines, and the promising prospects of several new districts, it is to be hoped that the year 1885 will show a considerable increase over the results recorded for the year just passed.

DISTRICTS.

CARIBOU.—The returns for 1884 shows that 1,559 tons were crushed, yielding 966 ounces as compared with 2094 tons, yielding 477 ounces during the preceding year. There was a little work done by Mr. McDonald near the free claim. The Caffrey mine was unwatered, and the lead found to be four inches thick at a depth of two hundred

feet. The reason given for the abandonment of the mine was the inadequacy of the pumps.

Messrs. Stuart, Gladwin and others opened a lead on Lease 162, near the lake, and sank about 35 feet on it. The measures dip south at an angle of forty-five degrees, and the lead cuts them on an irregular northerly course and westerly dip. It is curiously contorted in the slates, and in several points resembles the vein worked at Oldham, year before last.

At Moose River, Mr. Touquoy worked on Lease 140, on the Little North lode and on the Copper lode, in the spring. Later in the season he sunk 30 feet on the North lead, on the same lease, and worked for some time. The North, Copper, and Little North leads were worked on the Moose River Gold Mining Company's property by tributors. Messrs. Taylor and Walker worked on their areas.

DARR'S HILL.—Work has been steadily continued at this mine, and the extension of the faces has been kept up. The milling facilities have been increased, and the returns show that 9,799 tons of quartz were crushed, and yielded 3,379 ounces, against a return from the same district during 1883 of 7,602 tons of quartz crushed and a yield of 3,885 ounces of gold. The returns from the mine show that up to the close of the year 22,373 tons of quartz had been crushed and yielded 13,123 oz., 7 dwts.

FIFTEEN MILE STREAM.—Mr. R. G. McDonald did a little work on the Orion lead of the Hall-Anderson property during January, and in November the Company resumed work. The mill was fitted with electro-plated aprons, and arrangements made for concentrating the sulphurets.

Mr. James Hudson put up an engine for hoisting and pumping on his area in April. A new lead was found, by tunnelling north from the operations referred to in my last report, and on being opened up showed at a depth of 45 feet, a slate belt three feet wide yielding 24 dwt. per ton. Mr. J. G. Hudson, the manager of the mine, reports that he expects to have their crushing mill in operation before the spring. A little prospecting was done north of the Hall-Anderson property.

GAY'S RIVER.—Messrs. Pulsiver and Holdsworth did some prospecting during the summer, but mining in this district remains at a stand still.

MONTAGU.—In this district the Bluenose Gold Mining Company have continued working the DeWolf areas. They have opened up a lead in the eastern part of their property which is considered to be an extension of the Rose lead formerly worked a short distance to the eastward. Three shafts have been sunk, the main shaft being about 115 feet deep, and they show two leads respectively 10 and 5 inches in thickness. The returns show very good results. About 60

feet to the north a very rich lead is being opened by a shaft now 83 feet deep. This is called the DeWolf lode, and shows two veins 6 and 4 inches thick, which with two inches of intercalated slate yield one foot of crushing material. Mill tests have shown it to run 4 ounces to the ton. This mine promises to bring the district again to the front as a good field for work, and is fully equipped with an 8 stamp crusher, houses, whims, pumps, etc.

Mr. Gladwin did some work on the British American areas adjoining to the eastward, and proved the continuation of the veins referred to above.

The concentrator noticed in my last report worked for a short time during the summer.

OLDHAM.—Mr. A. McDonald sank on a barrel lode, from one to twelve inches thick, at the rear of the Stirling properties, to a depth of about 100 feet and carried a stope to the westward. Messrs. Fenwick, E. C. McDonald and others did some tribute work.

In the fall Mr. J. E. Hardman made arrangements for working the Lowell, Fraser, and Baker properties together, and is successfully mining a slate belt carrying low grade ore. It is proposed to re-open the main shaft on the Baker lead and to sink it to the point of intersection with the regular lodes of the district. The returns show 824 oz., 15 dwts., 12 grains from 921 tons of quartz.

RENFREW.—The returns show a yield of 1,679 tons of quartz and 569 oz., 18 dwts. of gold from the Empress mine, under the management of Mr. A. A. Hayward. The work commenced last year has been systematically carried on. The main shaft is being sunk 100 feet further to open a fresh lift. The hoisting and pumping appliances are well planned, and work very satisfactorily.

It may be mentioned here that part of the road from Enfield station to the mines has fallen into bad repair, and it is to be regretted that no steps have been taken to improve it.

A little prospecting has been done at a few points in the district.

SHERBRROOKE.—The returns show that 3,268 tons of quartz were mined and crushed with a yield of 2,668 oz., 11 dwts., as compared with 8,470 tons of quartz, giving 3,356 oz., 18 dwts., 17 grains during the preceding year. The highest returns were made during March when they showed 380 oz., and the lowest were 99 oz., in September, probably the smallest ever recorded from this district.

The Pactolus worked a small lead on the Rockville property, and Mr. D. R. Cameron worked its extension in the Gold Hill property, but it was soon abandoned. The large belt in the Pactotus was allowed to fill with water. A new lead was opened on the Wellington

property, a few feet north of the Dewar lode, but it did not come up to expectations.

Mr. Williams worked the Hayden and Derby and the New York and Sherbrooke properties, and at present this is one of the best paying properties in the district.

Some work was done on the Alexandria and Dominion areas. Messrs. McNab and Sinclair did a little work on the Caledonia property in the fall.

Most of the crushing of the past season was done in the Goldenville crusher, which was used as a custom mill.

The mining in this district is mostly on the tribute system, a rent of ten per cent. of the gold production being paid to the owners of the property. This coupled with the royalty forms a heavy tax on the adventurers. It is stated that many leads in the district, now lying unworked and filled with water, would be opened if they could be taken at a low rent.

COCHRAN'S HILL.—This district has not been worked during the past year. It is one that promises well, as gold can be readily found over a considerable area, but hitherto no systematic mining has been carried on.

STORMONT.—Operations in this district have been practically confined to the property of the Gallagher Gold Mining Company. They have extended their workings from the main shafts. The returns show that 913 tons (including some old dumps) were crushed, and yielded 2212 oz., 8 dwts. The total returns from this mine now show 1,978 tons crushed, and a yield of 5,034 ozs.

UNIACKE.—Mr. Davidson continued working on the hill until the fall, and attained a depth of 275 feet. Horses were used for hoisting, and at present operations are suspended, until an engine is put up.

Mr. Prince took out some lots of quarts from the Uniacke and other areas, and tribute work was done on the Montreal, Union, and other areas. The returns show a yield of 2235 tons of quartz, and 1140 ozs., 6 dwts, 2 grns. of gold as compared with 2,809 tons and 1,197 ozs. during 1883.

UNPROCLAIMED AND OTHER DISTRICTS.

YARMOUTH.—Some prospecting was done at Chegogin Point, and near Cranberry Head. At Kemptville, about 23 miles from Yarmouth, Messrs. Ryerson, Reeves, Cowan, and others did a good deal of work, and are making arrangements for erecting a crusher. A number of leads from four to eighteen inches in thickness were exposed and

traced for several hundred feet. Some of these leads shows gold, and the district is worthy of further attention. It is in measures in every way similar to those proved auriferous to the eastward, and ample water power can be had within a reasonable distance.

Discoveries of gold were reported from several points between Annapolis and Liverpool.

LEIPSIGATE LAKE.—The operations of the Messrs. Hall and Owen show a return of 130 tons crushed in the fall, yielding 410 oz. Fifty tons of which gave 250 ounces. It is to be hoped that this promising district will rank next summer among the best of the provincial mines. A crusher of ten stamps, driven by steam, has been built near the cross lead.

INDIAN PATH.—Here the main shafts on the big lead have been pumped out and put in thorough repair. About 20 tons of quartz have been taken out for a trial crushing. A new mill of 10 stamps, with all necessary fittings, was built by Mr. Henry Archibald. It is driven by steam, and it is expected that work will shortly be started.

RAWDON.—Promising developments were made here during the spring by Messrs. Simms and White on a lead four to seven inches thick, and on a belt carrying several leads from fifteen to twenty-five inches thick. A ten stamp mill was put up during the summer and the returns show that 217 tons were crushed yielding 241 oz., 7 dwts., 11 grains. This district is in an isolated position, but being in the auriferous measures of the Province, and showing good results, it merits more attention than it has yet received.

STEWIACKE.—The mill on the south branch was rebuilt, and a few tons of the low grade ore at the Saw mill were crushed. About three miles west of this point some prospecting was done by Mr. Chandler in conglomerate.

CHEZETCOOK.—In this district operations have been principally confined to the property of the Oxford Gold Mining Company. The returns show that 2,464 tons of quartz were crushed during the past year, and yielded 1,887 oz., 18 dwts., making the total returns 5,479 oz. from 4,550 tons of quartz. Mining has been carried on in the Mill and Coleman lodes to a depth of about 100 feet. Hoisting power, etc., is carried to the shafts by wire rope from the mill house, where additional engine power has been put up. The surface arrangements have been improved, and additional accommodation provided for those engaged about the works. The property has now one of the best mining plants in the Province, and its history has hitherto been a very successful record.

It is to be regretted that no regular work has yet been started on the other auriferous lodes of this district, as it promises to be **one of** the best in the Province.

COPPER.

During the past summer Mr. A. C. McDonald did some prospecting on a copper vein at Scott's Hill, Pictou Co. A little work was done at the Margaretville Copper, Annapolis Co. Here native copper and carbonate is found in the joints of the trappean ash, and the indications would appear to warrant further development. A few tons of copper is reported to have been extracted from one of the Pugwash deposits of gray copper ore. In this connection the developments being made at Dorchester, in New Brunswick, lead to a hope that some of these upper carboniferous deposits may have value in Nova Scotia.

Near Antigonish a deposit of copper ore was said to have been found in the fall. Some work was done near Whyhogomah on a vein of copper pyrites in a diorite band.

In the Ohio district an opening was made on a deposit of yellow and gray copper ore, yielding 1,120 lbs. of copper, $6\frac{2}{3}$ dwts. of gold, and 3 oz. of silver to the ton.

COXHEATH.—During the past year about 275 feet of drifting have been made to the north and to the south in the 190-foot level. During the progress of this work about 100 tons of 8 per cent ore were taken out. In addition to proving the continuity of the vein of ore found in the 140-foot level two new and promising veins were cut, which yielded about ten tons of 10 per cent ore from the exploratory drifts. One of the veins yielded some 30 per cent ore. The result of the exploratory work carried on under the superintendence of Mr. VanSlooten are stated to show in sight about 1,000 tons of ore between the 140 and the 190-foot levels, running from 5 to 10 per cent of copper, with good promise of continuity in depth.

The following estimate of Mr. Van Slooten would show that copper matte can be produced at Sydney under very favorable circumstances.

Assuming that 7 tons of 5 per cent ore will make one ton of 32 per cent matte, and a daily output of 50 tons:

Mining, dead work and transport to tide-water of one ton of ore	\$2.50
Smelting { Coke, $\frac{1}{8}$ of a ton, \$1.50	0.25
{ Iron ore, $\frac{1}{3}$ of a ton, @ \$1.50	0.67
{ Labor	0.25
{ Superintendence, oil, coal, etc.	0.25
Freight to Swansea, 1-7 ton of matte, @ \$5	0.72
Port charges and storage, 1-7 of \$1.75	0.25
Commissions, assays, etc.	0.72
Total	\$5.61

Which would leave a good margin even at the present low prices of copper.

IRON.

STEEL COMPANY OF CANADA.—During the past season the company continued working the East and West Mines. Preparations are being made for sinking below the No. 7 level, and an underground engine will be used for raising ore from the deeper workings. The company finding that they had large quantities of "Spathic ore" available in addition to the limonite which has hitherto been exclusively smelted, have begun to use it in their furnaces.

This mineral also known as Sideroplesite (classed by Dana as a variety of ankerite) is I believe found in few places in quantities making it valuable to the iron smelter. In general terms it may be described as ankerite with its calcic carbonate replaced by ferrous carbonate. Mr. Henry Louis, late analyst to the Steel Company of Canada, gives the following analysis of it, which shows that it is an important source of iron:

Insoluble silicious mater .....	.47
Calcic carbonate .....	.59
Ferrous "	69.20
Manganous "	1.37
Magnesian "	28.73
Ferric oxide .....	.08
	100.44

At first this ore was found in the West Mines mixed in strings and veinlets in ankerite, as the workings were deepened it became freer from ankerite; which at many points is present in very small amounts. The extensive deposits of this ore in the mine warrant the expectation that it will prove of much future economic value. Kilns have been erected for calcining it before it is introduced into the furnace. The returns of the mine shows that 54,885 tons of iron ore and 5,799 tons of ankerite were extracted during the past season.

On the East River, Pictou Co., some explorations were made on the farm of Mr. W. Grant by the Steel Company of Canada; and at other points by Mr. R. P. Fraser of Pictou. It is greatly to be regretted that no successful attempts have been made to utilise the large and varied iron ore deposits of this county.

Discoveries of iron ore were reported from Lorne, Pictou County, Whyhogomah, Inverness County, and Malvern, Annapolis County. Near Digby some prospecting was done on small veins of Magnetite in the Triassic Trap near its junction with the underlying sandstone. Analyses of the ore are said to show:

Iron	60.430
Silica	14.320
Phosphorus .....	.036
Sulphur .....	.046
Titanic Acid	none

ANTIMONY.

During the past year a valuable mine of antimony ore has been opened out at Rawdon, Hants Co. Two shafts, about 120 feet apart, have been sunk about 175 feet, and levels driven, and 600 tons of No. 1 ore raised. The vein, which is of gray antimony ore, is from 4 to 18 inches in width, cutting talcose slates. There is little impurity present beyond small amounts of quartz and calcespar. An analysis by Mr. M. H. Smith, made in Dr. Lawson's laboratory, Dalhousie College, showed the ore to be almost of chemical purity, having little beyond mere traces of foreign material.

This discovery has led to prospecting for other deposits of the ore, and it is probable that a large district here will be found to yield it. Similar ore has been reported from Upper Stewiacke.

As this ore is new in Nova Scotia, and may prove a source of profitable mining and smelting, I add a few remarks on it which may be interesting.

The metal antimony is occasionally found native. It occurs sparingly in this form at the Prince William Mine in New Brunswick, and is met in veins of silver and other ores in the Hartz and in Mexico. Its color and streak are tin white, and it is usually presented in the massive form with a distinct lamellar structure, which serves to distinguish it from native bismuth. The latter metal is of a silver white color with a tinge of red, and nearly as heavy as lead, while antimony is a little more than half as heavy. Native bismuth is as hard as crystalline gypsum (soft gypsum), while the hardness of antimony approaches that of anhydrite (or hard plaster.) Both these metals fuse and evaporate at a low heat.

The chief source of the metal however is stibnite, sulphuret of antimony, or gray antimony ore. This has a lead gray color and streak, and a shining lustre. It is brittle and usually columnar or fibrous. When heated in a candle flame it fuses readily, and before the blow pipe on charcoal it is absorbed, giving off white fumes and a sulphur odor. It resembles the common lead ore (galena) in color and lustre, but is distinguished by its extreme fusibility, and by being little more than half as heavy. The hardness of stibnite, that of soft gypsum, is slightly less than that of lead ore. There are a number of combinations of sulphur with antimony and lead resembling the gray ore, which fuse easily and give the reactions for antimony and lead.

Another mineral frequently found in this Province, which resembles antimony ore is the Sulphuret of Molybdenum. It may, however,

be distinguished by its extreme softness, permitting of its being indented by the finger nail, and by its feeling somewhat "greasy," like the purer forms of graphite. Antimony ore when pure contains in round numbers seventy-three per cent. of antimony and twenty-seven of sulphur. All ore carrying above forty per cent. of metallic antimony is classed as No. 1, that of a lower per-centage is ranked as No. 2.

Antimony ore is found in veins in rocks of varied age, and is frequently associated with ores of silver, gold, lead, iron, arsenic, etc. It occurs in the granitic and crystalline schists of Auvergne, Hungary, the Hartz, and Bohemia, and has been worked to some extent in Cornwall. In the United States several rich deposits are known on the Pacific Slope, but the distance from New York, the principal market, has as yet rendered all attempts at its reduction unsuccessful. In 1882 the amount reduced in the United States was about 60 tons valued at \$12,000. The annual consumption of the metal in the Pacific Coast is estimated at 25 tons.

The returns of the mines inspectors for 1883 show that it is not now mined in England. Upper Sarawak in Borneo is one of the chief sources of this ore, but the supply seems to be decreasing for the amount exported in 1883 was 1,361 tons against 1,856 tons in 1881, and 1,440 tons in 1882.

In New Brunswick the ore is found in strata of lower silurian? age, and has been intermittently mined and smelted during a number of years. The age of the strata holding the Rawdon antimony ore is not yet known from any survey, but it may provisionally, from their relation to the Rawdon auriferous strata, be considered lower silurian.

The ore is readily smelted and forms several alloys of great commercial value. It is used in making "type metal" which is said to contain one part of antimony to six of lead, and a little tin and bismuth. This alloy expands a little on cooling, and ensures a sharp, clear letter. Britannia metal which is superseding "pewter" contains 100 parts of tin to 8 of antimony, and either $2\frac{1}{2}$ parts of each copper and brass, or 2 parts of copper and bismuth. An alloy of tin with antimony forms the metal on which music is engraved. Glass of antimony is a mixture of sulphuret and oxide formed by partial reduction and fusion of the former. Babbit metal, well known for its use for machinery bearings, etc., consists of 83.3 parts of tin, 8.3 of copper, and 8.3 of antimony.

GYPSUM.

The total exports were 11,068 tons, against 144,688 tons during the preceding year. Mr. E. O'Brien, the Collector of Customs, attributes the falling off in the exports from the Windsor district to the Presidential election in the United States, and it is anticipated that the exports during the year 1855 will resume their normal volume.

At Windsor operations are carried on almost exclusively by Mr. Edward Dimock, who has, I am informed, combined the various quarries in the St. Croix River. During the past season he has replaced the horse tramway from the quarries to the river by a railway of standard gauge, equipped with a locomotive and a set of self-tipping five ton cars. The openings into the various quarry faces will allow readily of a daily shipment of 500 tons of gypsum. The amount shipped from Windsor last year was 80,072 tons. The quality of much of the rock was very good.

The New York Plaster Company reopened the old quarry at Grandique Ferry, Richmond County (said to have been worked by the French during the occupation of Louisburg), and built a wharf. It is expected that a considerable trade will be done during 1885.

The Messrs. McCurdy of Baddeck did not ship from their quarry on Baddeck Harbor, but sent away 2,795 tons from another quarry at St. Anne's, chiefly to Quebec.

MANGANESE.

The total produce of manganese ore during 1884 was 302 tons. Mr. J. W. Stephens continued working his mine at Tenny Cape, and small lots were mined at Cheverie.

At the East Mountain, near Truro, Messrs. Stevens and Carter took out about 30 tons of very good pyrolusite from the drift, and have, it is reported, found the vein which they consider to have yielded the drift ore.

At Loch Lomond, in Cape Breton, Mr. E. T. Moseley has continued working the Moseley manganese mines, and states that he is prepared to supply high grade ore, guaranteed 90 per cent of binoxide. He has put up machinery for hoisting and pumping, and done preliminary work.

LEAD, ETC.

SMITHFIELD.—One hundred tons of ore, averaging about 40 per cent of lead, were taken out in the fall, and a small smelter erected. The ore was burned in heaps, and it was found that calcination was not carried far enough. Calciners were then put up, and after proper roasting the ore was found to be self fluxing. The inception of this undertaking is extremely interesting, as the establishment of lead smelting will mark a new departure in the mining industries of the Province.

ACCIDENTS.

During the year 1884 the following Fatal Accidents occurred in Nova Scotia Mines.

No.	Date.	Name of Mine.	Name of person killed.	Occupation.	Remarks.
1	January 12..	Albion	James McLellan	Trapper	{ Left his door and was killed by the rake striking him.
2	March 7	Acadia	Peter Gillis	Loader	Fall of coal.
3	August 20 ..	Spring Hill	Frederick Crocker	Miner	{ Attempted to get on water-box, and was jammed against timber.
4	October	Reserve	Foreman Stubbett	Miner	{ Coal parted from lype while he was shearing.
5	November 4..	Albion	William Campbell	Miner	{ Premature explosion of shot from use of iron tamping-bar.
6	November 22	Sherbrooke	Andrew Stearns	Miner	Improperly thawing dynamite.
7	November 29	Londonderry ..	{ Richard Perry	Miners	{ Shaft of winding-engine broke, and they were thrown down the pit.
			Thomas Vigend.....		
			Nathaniel Rushton		
			Olive Rushton		

I would remark, with reference to the foregoing accidents :

1. This boy was employed on one of the McGregor slants, and provided with a safety hole, and with a rope to open the door. From the position he was found in after the accident it was evident that he had left his post.

3. This accident occurred as a direct violation of the special rules. From Mr. Madden's investigation into the accident it appears that he had endeavored to get on the iron water tank as it was being drawn out of the sump, and, failing to do so, was caught between the tank and some timber. The injuries he received proved fatal after a few days.

5. The death of William Campbell, who held a certificate of competency as underground manager, and the severe injury of his partner, arose from his iron stemmer igniting the charge. A similar accident, fortunately unattended with fatal results, befell George and Cyrus Simpson, in the Springhill Mines, November 21st. On the 9th of June Donald McKay was similarly injured at the Albion Mines, and another accident of the same character occurred at these mines early in the season.

7. This accident, by which John McInness and Samuel Chisholm were also severely injured, happened at the Dufferin shaft, which is two hundred feet deep. The engine had been working as usual during the morning, and after the dinner hour a party of six men started to go down. The drum barrel jumped from its position and the cage became uncontrollable; about the fifth level it appeared to have entered the slides, and the men fell the remaining distance of nearly 25 feet. The cause of the accident was the fracture of the drum shaft at the centre bearing. The shaft, which was a new one, and amply large for the weight, proved on examination to have had a flaw; but it had evidently been severely strained, as it was partially twisted. It has been conjectured that the cage might shortly before the accident have struck the timber in the pit and been strained, thereby causing a weakness which resulted in fracture. The flaw had not been detected during the turning of the shaft.

This accident recalls, in many particulars, the slope accident at the Vale Colliery, and the discovery of a reliable method of testing ropes, bolts, bars, etc., would prove a great boon.

There were five cases of fractured limbs from fall of coal—nearly all from coal loosened by shots. Several persons were injured by riding on rakes and back-balances, and in some cases narrowly escaped with their lives. It is strange how men will try to steal a ride to save themselves a safer, if more tedious, journey on foot.

A trapper boy in the McGregor pit left his door and obtained some powder, which he fired by a light he got by opening his safety lamp, and was severely burned. Two boys playing in a somewhat similar

manner managed to set the Vale Colliery seam on fire; fortunately the fire was put out before any damage was done.

I may remark that, so far as I am aware, no accident of any kind occurred from ignition of fire damp.

MISCELLANEOUS.

The following is a list of the men who have received certificates from the Board of Examiners:

CERTIFICATES OF COMPETENCY—UNDERGROUND MANAGERS.

Thomas Scott.....	Springhill.
Henry Swift	"
Thomas Routledge	Sydney.
Hugh Campbell.....	Cow Bay.
James Baird.....	Chignecto.
J. G. S. Hudson	Stellarton.
James Maxwell	Westville.
Alex. McInnis	Springhill.
F. Burrows.....	Springhill.
F. Park.....	East Mines, Debert

OVERMEN.

Alex. McDonald.....	Stellarton.
James Rogers.....	"
George Wilson.....	Chignecto.
A. L. Edmunds	Cow Bay.
Ed. Wilkinson	Stellarton.
John Weir	"
W. Reese	Springhill.
M. Dunlap	Chignecto.
W. Lorimer	"
Allan C. McKinnon.....	Springhill.
John Maxwell	Stellarton.
Allan Caldwell.....	Sydney Mines
A. D. McKenzie	Stellarton.

CERTIFICATES OF SERVICE—UNDERGROUND MANAGERS.

John Dunbar	Stellarton.
R. Redpath.....	Minudie.
R. Wilson.....	
W. Conway	Springhill.
A. Purvis	Westville.
M. Walters.....	Glacé Bay.
Henry Morley	Cow Bay.
John Johnstone.....	Bridgeport.
John Douglas.....	Stellarton.
Thomas Turnbull	Vale Colliery.
George Scott	Caledonia.
Joseph Simpson.....	Sydney Mines.
W. McNamara.....	Lingan.
P. P. Burke	Joggins.
A. L. Anderson	Cow Bay.
W. Adamson.....	Glacé Bay.

OVERMEN.

William Young	Lingan.
Angus McKeigan.....	Bridgeport.
George Kay	Sydney Mines.
J. B. Greenwell	" "
John McKay	Stellarton.
Thomas Johnston	Cow Bay.
T. Fletcher.....	Reserve.
James Johnstone.....	Westville.
Ed. Harris	"
J. Bradley	Springhill.
Mat. Spoors	Vale Colliery.
W. Stafford	N. W. Territory.
D. Hayman	Westville.
Jas. Findlay.....	"
Jas. Hunter	"
J. J. Duff	"

The candidates who presented themselves last year were chiefly overmen holding certificates of competency and desirous of advancing themselves to the position of underground manager. The papers showed that much care and trouble had been taken by the candidates; but they were deficient in one branch, that of surveying, although the standard in this was not high. It is impossible for men to get any knowledge of surveying as applied to pit and colliery purposes unless they are taken by the hand and taught it practically. I may say for myself, as a member of the board, that unless readily accessible means are provided for some candidates of instruction in surveying and the elementary principles of mining, I feel that the work of the board will not prove satisfactory.

THE EMPLOYMENT OF COMPRESSED AIR IN VENTILATION.—The use of fans and blowers for driving places off the air is well known. Hitherto all attempts to utilize compressed air, etc., for driving these machines have proved expensive and unsatisfactory in coal mines, although compressed air, intended primarily for drilling, has been found a useful adjunct to ventilation in metalliferous mines. Experiments have been made in Germany which show that the direct use of compressed air may be found advantageous under some conditions of coal mining. A plant compressing air up to four atmospheres furnished a supply equal to the ventilation of forty-five working places. The air was carried in zinc tubes and delivered through an aspirator. The total delivery of air was 15,500 cubic feet.

SAFETY LAMPS.—The recent enquiry made by the Midland Institute of Mining Engineers into the comparative efficiency of the best known safety lamps, presents many points of interest to coal miners. It was found that in an explosive current travelling at the rate of from 6 to 14 feet the ordinary Mueseler, the Clanny, the Davey, the Stevenson, the Thompson and the Bainbridge lamps, were unsafe. Further experiment showed that the improved and protected Mueseler, the Routledge and the Johnston and Purdy lamps were safe until the current reached a velocity of 19 feet per second, when the Mueseler lamps exploded by an oblique ascending current. On increasing the current to 35 feet the lamps that proved the best were those of the Smethurst type (fitted with a bonnet), the improved and protector Mueselers, and the Routledge and Johnston.

COAL BANKING.—Where the shipment of coal cannot be carried on continuously throughout the year, as is unfortunately the case with most of our coal mines, recourse must be had to banking out the product of the pit. The loss arising from the repeated handling, and the disintegrating effects of our changeable climate, frequently make the operator hesitate to work his mine when he cannot see any chance of immediate shipments. Attempts have been made to "bank" coal underground in the working places, but it does not appear that any decided advantage is gained. When large amounts of coal have to be shipped rapidly from a mine working up to its capacity the underground stores of cut coal cannot be largely drawn upon without interfering with the regular work of the pit, while the surface bank can generally be utilized to any desired extent. In this connection the following account of a cheap and readily available plan for lessening the breakage of bank coal taken from the *Engineering and Mining Journal* may prove interesting to our managers of coal mines:

Wenzel Koech, of Karbitz, Austria, argues that if coal is placed in an atmosphere of steam, which excludes oxygen from the coal, the hygroscopic water will have no tendency to leave the pores of the coal, nor can a chemical action set in, even in the presence of pyrites, the oxidation of which is, under other circumstances, essentially promoted by the presence of moisture. It is, therefore, not to be doubted that, by displacing the oxygen and keeping the coal moist, alteration

and spontaneous combustion may be checked. A complete immersion would meet the requirements, but would only be practicable in rare cases. Wenzel Koech excludes the air and produces a uniform wetting of the stored piles of coal by admitting spent steam into them. For this purpose a series of trenches are cut in the ground; they are so covered with beams and boards that narrow spaces remain, not large enough to permit the coal to fall through. The boards are simply laid on cross-pieces, are not fastened, and can be easily removed for the purpose of cleaning out the trenches. On the ground thus prepared the coal is deposited in the usual way; the trenches are then connected with the exhaust-pipe of a steam-engine, and the steam admitted; it passes through the interstices in the covering into the coal-pile, disseminates itself through the latter, displaces the air, and, in consequence of the condensation of the steam, moistens the coal. In order to effect a uniform distribution of the steam it is necessary to cover the coal-pile with fine coal and cinders, as in the case of charcoal heaps, whereby strong draughts of air will be prevented from passing through the pile and interfering with the equal distribution of the steam. In the case of coal containing little pyrites careful covering of the coal is not so necessary, but it is of importance in the case of coal rich in pyrites. The distance apart of the trenches in large heaps of coal depends upon the sizes of the pieces of coal to be stored and the height of the pile; for medium-sized coal the distance between the trenches with a height of pile equal to 10 feet is 10 feet. The exhaust-steam of a steam-engine of 4-horse power, which worked but six hours during the day, was entirely sufficient for the preservation of a depot of 20 carloads of coal.

In carrying out the process it was repeatedly shown that the losses sustained in the unloading of the coal are far smaller than they are usually assumed to be, and that in this assumption a large portion of the waste produced by attrition was attributed to the destruction in dumping. In the loading of the coal preserved by steam it was found invariably that only in the locality where the first unloading took place, and where the coal fell from greater heights, attrition took place; the rest of the coal was good, was well preserved, and could be loaded without re-sorting. The cost of construction of the trenches and their covering—for which latter old and otherwise useless boards, timbers, and ties of the mine are utilized—for a dump of 100 carloads of coal amounts at most to \$12.50. The cost of working is nothing, and the outlay consists only of the cost of preserving the trenches, and the interest and sinking fund on the capital invested.

Results relative to the use of this process have been obtained at several mines. At the Ferdinand shaft, belonging to the Austrian Coal Industry Association, confirmation of the described preservation method was quite accidentally found. Over a reservoir covered with debris, and into which exhaust-steam passed, coal had been deposited, which, on reloading, was found to be perfectly preserved. According to communications from mining engineer Hans Gutmann, further experiments were carried on with favorable results, and the working

of the process on a larger scale was proposed. The director of the Bruno mine uses old gratings to cover the canal. He also subjected coal, without covering with cinders, for more than two months to exhaust-steam, and found it in no way altered.

SHOT-FIRING IN COAL MINES.—Enquiries recently made by the English Government confirm the opinion that shot-firing is the source of most explosions; and it has been proposed to confine shot-firing to the time between shifts, and that during the progress of the blasting the shot firers only should be in the pits. This would prove undoubtedly a great safeguard, but in many mines the precaution would appear too great, so far as gas is concerned, provided that the preliminary examinations were properly conducted.

The effects of coal dust, however, must not be overlooked in this connection. The extension of gas explosions appears to be due in some instances to the almost impalpable dust of dry mines; and recent experiments at Koenig Colliery, near Saarbrucken, show that some coal dusts are capable by themselves of extending shot flames and producing considerable explosions.

At this colliery a drift was made, 167 feet long, in an old rock dump, timbered with double T iron, and lagged with two-inch plank. The drift was covered on all sides except the top, where thirty small bull's-eyes were inserted so that the drift could be examined during an explosion. The face of the drift was made of solid masonry into which seven small mortar guns were built. Two of these were near the roof and laid to strike the floor of the drift 33 feet from the face; three were placed in the middle of the face, so that they would hit the floor at a distance of 16 feet; the rest were placed near the floor.

A gun holding a charge of 8 oz. of powder, with clay tamping, was fired, and gave in the ordinary atmosphere a flame 10 feet long. The same charge, when tamped with fine coal, gave a flame 26 feet long.

When the floor of the drift was covered with a layer $1\frac{1}{2}$ inch in thickness of fine dry coal from the Union Colliery, the shots gave, with clay and coal tamplings respectively, flames 18 feet and 31 feet long, showing that this coal dust did not appreciably affect the length of flame. When, however, a similar test was made with coal dust from the Pluto Colliery, where several explosions have taken place, flames were produced 190 feet long, and a strong explosive force developed. As the drift was entirely free from explosive gas the results of these experiments, which were many times repeated, would show that the manager of a dry coal mine should acquaint himself with the effect of blown-out shots on the dust of the mine under various conditions.

It will probably be found that there is some chemical rule of composition, or some state of aggregation, rendering certain coal dusts liable to ignition. The experiments should be extended to test the effect of different velocities of *air* in carrying coal dust, and trans-

mitting its flame; and to the comparison of the inflammability of fresh dust, and of that exposed to the atmosphere for some time.

PIT ROPES.—The following remarks taken from a paper recently read by Mr. R. I. Frechville, H. M. Inspector of Mines for Cornwall, will prove interesting to miners. He says:

Of all mining operations none is more important than that of winding, or has undergone more changes or improvements during the last quarter of a century, especially in the coal fields, where, in consequence of the increased depth and enormous output of the mines, great attention has been bestowed on this branch of mining engineering. In some instances from 1,000 to 1,500 tons of coal are drawn from a single pit in a day, the cages running at a speed in the shaft of from 1,500 to over 2,000 feet per minute. This result is due not only to the shafts being perpendicular, and powerful engines being employed, but also to the marked improvement of detail in the appliances used.

The rope to be used is a matter of the first importance, especially in those cases where the security of human life is dependent on its efficiency. The essentials of a good rope are flexibility and strength, combined with the least possible weight. Experience has shown that in the majority of cases these requirements are best fulfilled by round steel wire ropes. Iron wire ropes are fast going out of use, owing to the larger sizes required for given strengths, with consequent increase of dead weight to be subtracted from the useful load. It must, however, be borne in mind that, where the water contains much acid, the injurious effect of this on a steel wire rope would be greater than on an iron wire rope.

The physical properties of steel largely depend on the proportion of carbon combined with the iron, the addition of carbon increasing the hardness and ultimate strength, while the ductility and power of resistance to shock and sudden stress diminish. The softer kinds of steel, however, which contain least carbon, approach wrought-iron in character, having equal toughness, greater strength, and the same capacity for welding. The milder steels contain from 0.15 to 0.4 per cent of carbon, and the hardest from 1.4 to 1.6 per cent. The following are the breaking strains per square inch of wire of some of the most usual varieties employed in rope-making:

Mild steel.....	from 40 to 50 tons.
Best crucible steel	" 50 " 60 "
Best patent steel.....	" 70 " 80 "
Best plow steel	" 110 " 120 "

Too great stress cannot be laid upon the necessity of having ropes constructed of the best material. The selection of the material however, somewhat depends on the conditions of working. Thus, with a perpendicular shaft and large drums and pulleys, a plow-steel wire rope will be found the most reliable; but with small drums and pul-

leys, and a shaft with angles in it, a rope made of best patent steel or mild steel will last longer, as the wires are not so apt to snap in bending. In describing a wire rope, the number of strands, the number of wires in each strand, their gauge, the quality of metal, and the material of which the centre or core is composed, should be specified.

Now as to the gauge, since the ultimate strength of wire increases as its diameter decreases, and since small wires are more pliable than large ones, it would seem that the finer the wire used the better; but there is a practical limit to this, as very fine wire offers too much surface to oxidation, and is too easily injured by friction. Experience has shown that it is advisable to employ medium sized wires, between Nos. 10 and 15 of the Birmingham wire gauge. For ordinary work hemp cores or centres have been proved the best; they stretch with the strands, allow the wires to bed themselves solidly, and give ropes greater flexibility than could be obtained with wire centres. The latter have not given very satisfactory results in practice, although a greater breaking strain is obtained with a relatively smaller rope.

There are many modifications in the methods of laying or twisting the wires. Common laid rope has six strands with seven wires in each, the size of the wire being altered to suit the size of the rope. Compound ropes, that is, ropes with more wires in the strands than in the usual construction, in addition to other varieties, have six strands with 19 equal sized wires in each, or seven strands with 6 wires in the middle of about 15 gauge, and 12 round the outside, alternately 15 gauge and 12. Ropes with six strands of 11, 12, and 13 wires each are frequently manufactured. Some makers prefer the inner wires of each strand smaller, so as to be more flexible than the outer. Six strands in a rope are better than four or five, as they make it more cylindrical, and consequently the friction is better distributed. Six strands of 19 wires each make very durable ropes. These work better than one of equal size composed of 6 or 7 wires in a strand, as the latter, being larger and less pliable, are more liable to snap in passing round pulleys and drums. When three or four of these wires break near together the rope is hardly fit for work, whereas the breakage of small wires would be of much less consequence. More material can be got into the same sized rope when compound instead of common laid, as the smaller wires do not leave so much space between each other.

On account of the many different sizes of steel wire employed in the manufacture of rope, and the varying sizes of the hemp centres, and the empty spaces above referred to, it is impossible to state a formula for determining the dimensions of a steel wire rope to bear a given strain. As the nature of a wire rope, however, is defined by the number and size of the wires, it is easy, if we know the section and weight per fathom of the gauge employed, to determine the effective sectional area of the rope and its weight per fathom; given, then, the quality of the metal, the breaking strain of the rope can be approximately estimated.

The following table, in which the numbers of the Birmingham wire gauge most usually employed in the construction of mine ropes, are compared with inches, and the weight of a cubic foot of steel is taken at 487 pounds, will be found useful in these calculations :

No. B. W. G.	Diameter in inches.	Sectional Area in square inches.	Weight per fathom in pounds.
10.....	.137	.01474	.2990
11.....	.125	.01227	.2489
12.....	.109	.00983	.1893
13.....	.095	.00708	.1436
14.....	.083	.00541	.1097
15.....	.072	.00407	.0825

Thus in the case of a steel wire rope composed of six strands, 7 wires in each, of 10 gauge, the effective sectional area will be $6 \times 7 \times .01474 = .61908$ square inches, and its weight in metal, and its weight per fathom in metal $6 \times 7 \times .2990 = 12.55$ pounds. If best plow-steel wire with a breaking strain of 120 tons per square inch is employed in its manufacture, then $.61908$ the effective sectional area $\times 120$ tons = 74.28 tons, and deducting $\frac{1}{8}$ for lay, we obtain 65 tons as about the breaking strain of the rope.

Again, let us suppose a compound rope made of the best patent steel wire with breaking strain of 75 tons per square inch, and composed of six strands of 19 wires each, 13 gauge. The following calculation— $6 \times 9 \times .00708$ sectional area of each wire by 75 tons breaking strain per square inch of wire, less $\frac{1}{8}$ per lay, gives us 52.97 tons as the approximate breaking strain of the rope. Such a rope, with hemp core and fairly made, would weigh about 18 pounds per fathom, and have a circumference of about $4\frac{1}{2}$ inches. The actual breaking strain, however, can only be found out by testing sample lengths of the finished ropes.

As the operations of manufacture introduce so many elements of uncertainty in wire ropes it is well to allow a wide margin of safety, especially where their breakage would endanger life, and to take the working load as one-tenth of the ultimate strength of the breaking strain. The weight of the rope hanging over the pulley at the poppet-heads is of course included in the working load. In very deep mines this weight, even with steel wire ropes, becomes a matter of such serious consideration that tapering ropes have to be used. In the case of a rope working at a very slow speed, such, for instance, as a capstan rope, a larger factor of safety than one-tenth may be adopted.

Since any extra strain on a rope leaves it weaker than it was before, on no account should a rope used for raising men be ever worked above a fair working load. Experiments made at some of the coal mines prove that, when the full cage is lifted from the bottom, about double the ordinary strain due to the load is produced. This arises from the inertia of the mass to be moved. In winding men, there

should be no resting-place for the cage ; the engine should be started gently, driven regularly, and with a speed of only about two-thirds of what is otherwise usual. The rope also should be examined every twenty-four hours, and this should be done by winding it slowly through the operator's hands ; if he does not happen to see the broken wires, in all probability he will feel them. Occasionally the rope should be thoroughly cleaned, and its condition more minutely ascertained. When broken wires are found, the longest may be tucked underneath and the others cut off to prevent their catching and doing further mischief. The most careful watch must be kept on the portion of the rope where they occur.

A new rope should be tested with several days' winding before men's lives are trusted to it. It is indispensable for the preservation of steel wire ropes that they should be greased regularly. The grease used should be perfectly free from acid, and be soft enough to work into the strands right through to the hemp core. It must not be of such a nature as to harden ; for in that condition, it allows rust to form between it and the wire, so that a rope which appears to be well greased may be corroded to a sensible depth. A mixture of Stockholm or Archangel tar, a vegetable oil, and a little lime boiled together, is often recommended. In this county, the tar is mixed with tallow. These mixtures, however, form too stiff a grease, tend to hide defects, and render the thorough examination of the rope difficult. A mixture containing gas-tar is still more objectionable. Some of the heavy mineral oils, such, for instance, as the Russian, their specific gravity being higher than the American, possess sufficient viscosity to be used as a lubricant for wire ropes, and will, if tried, owing to their freedom from acid and to their power of assisting decomposition, be found to give satisfactory results. At the Wearmouth colliery, they have a patented apparatus, consisting of a pair of wire brushes for cleaning the ropes, and a pair of strong hair brushes, fed with lubricant from feeders above, for oiling them. Both sets of brushes revolve, being actuated by the travelling rope. It is claimed that this arrangement lubricates very thoroughly, and effects a great saving in oil and labor.

When a rope is used for winding men, the shackle should be cut off regularly every two or three months, the rope thoroughly examined, and the shackle reset. This is a point of vital importance for wire ropes. In order to arrive at economical results with wire ropes, accurate accounts should be kept of their working. By this means, the kind most suitable may be ascertained, and a considerable saving effected by using an article best adapted for the purpose. However well a rope may seem to be lasting, it should always be suspected as soon as its duration approaches the average that corresponds with the conditions under which it is working ; it should, at any rate, cease to be used where human life depends on it.

Owing to trade competition, there is great danger of inferior metal being used in the manufacture of ropes, so that, when a new one is required, only the best makers should be applied to, and they should

be furnished with full information as to the conditions under which it has to work. There can be no greater false economy than choosing a cheap rope. When a rope is for the purpose of winding men, it would be advisable to have a sample piece of it (say a length of from 10 to 12 feet) tested before use, in order to see that the quality of the metal and the breaking strain are as represented.

At East Pool, to put on the shackle, the rope is first lashed around with copper wire about 8 inches from the end; the strands are next untwisted, and the wires turned back singly; some are cut off at different lengths, so as to make the requisite taper; while the whole is then bound around with copper wire. The shackle, being heated to redness, is, after the tapering end of the rope has been inserted, hammered down to fit it snug. A coupling is then screwed on, and the shackle brought as tight as possible on the rope. Finally, a steel punch is driven through, to make place for the rivets, which are put in and fastened in the same way as boiler-rivets. The rope end is manipulated at both South Frances and Wheal Sisters in very much the same way as described above, being made of a conical shape like the inside of the socket. It is then pulled back, and a round center-pin of steel driven up in the middle to wedge it. With the socket used at Wheal Sisters, each chain of the runner passes over a separate heater-pin: this is certainly safer. The comparative merits of these attachments have not been ascertained by testing; it is very desirable, however, that this should be done. In many of the coal mines, they use a shackle with hoops and rivets, which is fastened to the rope as follows: The end is untwisted for about six inches; it is then doubled to suit the length of the shackle, the loose end twined around the main rope, and the whole bound with hemp twine soaked in tar; rivets with countersunk heads are put through both ropes and the shackle; the hoops are next put on and driven home tight. This, though doubtless a very strong connection, is not suitable for passing over pulleys and rolls, as our shackles are required to do.

The screw-heater and swivel, with their pins, should be made of from $1\frac{1}{2}$ to $1\frac{5}{8}$ -inch, the runner chains of from $\frac{5}{8}$ to $\frac{3}{4}$ -inch, and the coupling-chains of from $\frac{1}{2}$ to $\frac{5}{8}$ -inch best wrought-iron bar. The pins should be secured in their places by jam-nuts. There should be five coupling-chains—one at each corner of the cage and one attached to the center; the latter carries no weight, but hangs a little slack, and is provided, in case a corner one should break, in order to prevent the cage tipping to one side and jamming itself in the shaft. The links should be made as short as is consistent with easy play, and those at the extremities a little larger and stronger than the rest. Chains require frequent and careful examination, as the links may wear into each other without being detected if not well looked after; also, owing to shocks, jerks, and alternations of temperature they are subjected to when in work, the iron undergoes a change in structure, and gradually becomes hard, crystalline, and liable to snap, as is seen in the case of railroad wagon couplings, which often break short with a crystalline fracture, apparently having had very little wear.

So far as this district is concerned, some of the principal details connected with our winding appliances, and more especially the precautions to be observed in the selection and treatment of wire ropes, have now been briefly touched on. There still confronts us, however, this most important question: In those mines where the men ascend and descend by cages, what means should be adopted in order to avoid the consequences of the breakage of the winding rope?

An attempt has been made to deprive accidents of this nature of their serious character by the application of safety-catches to the cage. About thirty years ago, many different sorts were invented, and for some time were in general use in the collieries, but now you seldom meet with them. It is said that they are liable to come into action when not wanted, especially with quick winding and during the descent of the cage, thus introducing an extra source of danger.

Most of these catches depend on the action of a spring, which comes into play on the breakage of the rope, and forces against the guides either eccentric clutches or levers with sharp points; the weight of the cage then causes the clutches to grip the guides, or, in the case of the levers, the sharp points to penetrate into the wood.

Although there are instances of life having been saved by some of these contrivances, there are also some instances of their failing to act, as in the case of the rope breaking at the Duke Hardenburg colliery (Westphalia), on December 21st, 1882, when 25 men lost their lives. The rope broke just as the cage, fitted with safety-catches, reached the surface; but unfortunately, these did not come into operation.

There appears to be a very general dislike to trust to the action of a spring in such a wet and dirty place as a shaft, and it is also thought that the use of catches would have a tendency to introduce a want of attention to the condition of the rope, and to encourage an attempt to unduly increase its working life.

The following papers relating to the Geology and Mineralogy of Nova Scotia have been read during the past year:

BUDDEN, H. A.—“The Coal of Nova Scotia.” Montreal: Meeting of the British Association.

GILPIN, E., JR.—“Notes on the Manganese Ores of Nova Scotia.” Royal Society of Canada.

“Results of Past Experience in Gold Mining in Nova Scotia.” Montreal: Meeting of the British Association.

“A comparison of the distinctive features of the Nova Scotia Coal Fields.” *Ibid.*

“Notes on the DeBert Coal Field.” N. S. Institute of Natural Science.

“Cape Breton Manganese.” *Ibid.*

HONEYMAN, REV. D.—“Notes of a Microscopic and Polariscopic Examination of Nova Scotian Crystalline Rocks.” *Ibid.*

“Glacial Distribution in Canada.” Geologists' Association.

MURPHY, MARTIN, Prov. Engineer.—“On some Physical Features of Nova Scotia, with Notes on Glacial Action.” N. S. Institute of Natural Science.

SELWYN, A. R. C., Director of Canadian Geological Survey.—“Sketch of Canadian Geology.” Geo. Surv.

I have the honor to remain, Sir,

Your obedient servant,

EDWIN GILPIN, JR.,

Inspector of Mines.

LIST OF MINERAL LEASES (OTHER THAN GOLD).

No.	Lessee.	District.	Area, Sq. Miles.
	COPPER.		
	ANTIGONISH COUNTY.		
2	Ross, McKay, and others .....	.....	1
	COLCHESTER COUNTY.		
	Moir, Wm. C., et al.	Tatamagouche	10½
	CAPE BRETON COUNTY.		
See Lease 105	Burchell, J. E. ....	.....	1
" 106	Burchell, G. L., and others. ....	.....	1
" 95	Coxheath Mining Co. ....	.....	1
104	McKenzie, H. R., et al. ....	.....	1
94	McKenzie & McKim. ....	.....	1
	HALIFAX COUNTY.		
1	McClure, Chas. F.	Gay's River.	1
	IRON.		
	PICTOU COUNTY.		
44	Hudson, James.	East River.	1
43	Hudson, James.	" "	1
Total area under lease.			square miles.

LIST OF MINERAL LEASES (OTHER THAN GOLD).—Continued.

No.	L. sec.	District.	Area, Sq. Miles.
IRON.—(CONTINUED).			
CAPE BRETON COUNTY.			
86	Brookman, S., et al.	N. Side East Bay	1
91	Brookman, S. L.	East Bay	1
93	Brookman, S., et al.	East Bay	1
102	C. L. Ingraham	" "	1
103	A. McKenzie, et al.	" "	1
92	Matheson, D., et al.	" "	1
84	Protheroe, Pryse	Cow Bay	1
INVERNESS COUNTY.			
16	Inverness C. I. & R. Co.	Whycocomagh	1
Total area under lease.			27½ square miles.

16	Seaman, Gilbert.....	.....	1	Working.	<i>M. Dunlop</i>	River Herbert
24	Shannon, S. L. ....	.....	2			
36, 39	Shannon, S.L. (in trust) et al	.....	2			
22, 23, 28, 29, 30	Styles Mining Co. (Ltd)....	.....	5		J. S. Hickman..	Amherst.
9	Victoria Coal Mining Co....	.....	2			
26, 27	Wright, John V.....	.....	3			
			65			
		PICTOU CO.				
1	Acadia Coal Co.....	Fraser.....	1	Working.	{ H. S. Poole ...	Stellarton.
3	" "	Acadia	1	"	{ <i>J. Maxwell</i> ...	Westville.
42	" "	Pictou.....	4	.....	{ J. B. Moore ...	New Glasgow
23	Allan, Sir Hugh, K't.....	Vale	3	Working.	{ <i>John Greener</i> .	Vale Colliery.
10	Gray, B. G., et al.....	.....	1			
11	Halliburton, R. G., et al...	.....	1			
	Halifax Co'y, (Ltd).....	Albion	4	Working.	{ S. Cunard & Co	Halifax.
13, 14	Intercolonial Co'y.....	.....	2		{ <i>J. Rutherford</i> .	Stellarton.
12	" "	Drummond	1	Working.	Robert Simpson.	Westville.
6	Kirby, Lewis R.....	.....	1			
15, 30, 31	Merigomish Co'y.....	.....	3			
25	Nova Scotia Co'y	Black Diamond..	4		M. H. Angell ...	Westville.
24	Richey, M. H.....	.....	1			
			27			

LIST OF COAL LEASES.—(CONTINUED).

No.	Lessee.	Colliery.	Area Sq. Miles.	Working.	Agent and Manager.	Postal Address.
3	Archibald, Blowers.....	CAPE BRETON CO.				
2	Archibald, Thomas D.....	Gowrie	1	Working.	{ Archibald & Co... Chas. Archibald .	North Sydney Cow Bay.
5, 28	Blockhouse Mining Co.....	"	1			
29	" (sea area).....	Blockhouse	2	Working.	R. Belloni	Cow Bay.
72	Brookman, Samuel.....	"	1			
76, 77	" S., et al.....	"	1			
15	Caledonia, C. & R. Co.....	"	2			
31	" (sea area).....	Caledonia.....	1	Working.	David McKeen....	Caledonia M's
30	Campbell, Alex	"	1			
8, 9	Halifax Coal & Iron Co....	"	1½			
87	Cossit, Geo. G	Ontario	1	Working.	T. D. Archibald... John Sutherland ..	North Sydney Pt. Caledonia.
	General Mining Association	Bridgeport.....	2			
27	" " "	Sydney.....	18	Working.	{ Rich. H. Brown.. Cunard & Morrow	Sydney Mines Halifax.
	" " (sea area).....	"	4		{ H. Mitchell	Bridgeport.
38, 39	" " "	"	13		{ Joseph Simpson ..	Sydney Mines
10, 21	" " "	Lingan	10	Working.	Donald Lynde	Low Point.
4, 12, 16	Gibson, John, et al.....	"	2			
75	Glance Bay Mining Co.....	Glance Bay	3			
22	Henry, W. A.....	"	1	Working.	{ E. P. Archibald .. Chas. Rigby	Halifax. Lt. Glance Bay.
	Ingraham, J. L	Halfway	1			

		International Coal Co. Ltd.	International . . .		Working.	<i>P. Johnstone . . .</i>	Bridgeport.
6, 13, 18, 19		International Coal Co. Ltd.	International . . .	4			
71		Jennings, Edward . . .	.....	1			
47		LeCras & McInnes . . .	.....	1			
66		Merchants' Bank of Canada.	Gardener . . .	2			
74		Moore & Moseley . . .	.....	1 $\frac{1}{4}$			
101		McDonald, W. B . . .	.....	1			
52, 53		McLeod, Hugh . . .	.....	2			
88, 89, 90		Paint, Henry N., and others.	.....	3			
83, 85		Protheroe, Pryse . . .	.....	2			
73, 82		Reid, Thos. S. (<i>sea area</i>) . .	.....	2			
40, 41, 42		Ross, H. E., et al . . .	.....	3			
79		Ross, W. J., et al (<i>sea area</i>)	.....	1			
43		South Head Coal Co. . . .	South Head . . .	1			
32		Sword, Wm. (<i>sea area</i>) . . .	.....	3			
23, 25, 70		Sydney & Louisburg Coal &	.....			
14, 24		R. R. Co., Ltd. . . .	Schooner Pond . .				
49		" " " " . . .	Reserve . . .	10	Working.	{ F. C. Kimber. W. Routledge.	Sydney. Reserve Mines
64, 65, 68		" " " " . . .	Lorway . . .				
69		" " " " . . .	Emery . . .				
54 to 63		Sydney C.M. Co. (<i>sea areas</i>)	.....			
46		Toronto Coal Co. . . .	Collins . . .	10			
67		Weatherbe & Kirby . . .	.....	1			
78		Weatherbe, R. L. (<i>sea area</i>)	.....	1			
96, 97, 98, 99, 100		Low Point, Barasois and Lingan Mining Co. Ltd.	.....	5			
		" " " " . . .	.....	5			
		" " " " . . .	.....	2		D. Lynk.	Low Point.
				128 $\frac{3}{4}$			

LIST OF COAL LEASES.—(CONTINUED).

No.	Lessee.	Colliery.	Area Sq. Miles.	Working.	Agent and Manager.	Postal Address.
5	Aylmer, John Evans Freke.	INVERNESS CO.	2			
8	Evans, Thomas	Cape Mabou	1			
9	Evans, Thomas (<i>sea area</i>).	Chimney Corner.	1			
7, 12	Inverness C. I. & R. C		2			
13	McGregor, J. D	Port Hood	3		Alex. Wright. . .	Moncton.
4	Richey, M. H., et al		1			
11	Ross, W. J.	Broad Cove	1			
6	Ross, H. E., et al, (<i>sea area</i>)		1			
14, 15	Smyth, Peter		2			
10	Tremaine, E. D., (<i>sea area</i>)		1			
17	McDonald, Hugh		1			
		RICHMOND CO.	16			
2	Victoria Oil and Mining Co.	Little River	1			
		VICTORIA CO.	1			
2	Kenny, T. E.	New Campbellton	3			
3, 4, 5	Ross, William	Black Rock	5			
			8			
Total area under lease			245 $\frac{3}{4}$	square miles.		

TABLE A. COAL TRADE BY COUNTIES.

	CUMBERLAND.		PICTOU.		CAPE BRETON.		OTHER COUNTIES.		TOTALS.	
	Raised.	Sold.	Raised.	Sold.	Raised.	Sold.	Raised.	Sold.	Raised.	Sold.
1st Quarter.....	58,077	49,549	103,428	80,378	46,557	8,376	.....	.....	208,062	138,303
2nd Quarter.....	74,744	71,643	133,943	109,421	156,640	126,851	.....	.....	365,327	307,915
3rd Quarter.....	73,396	69,619	150,683	156,027	239,574	260,955	.....	.....	463,653	486,601
4th Quarter.....	73,729	67,594	123,139	118,355	155,385	142,882	.....	.....	352,253	328,831
Total.....	279,946	258,405	511,193	464,181	598,156	539,064	.....	.....	1,389,295	1,261,650
1883	247,861	222,347	505,626	461,809	668,293	612,614	773	753	1,422,553	1,297,523
1882	243,284	218,349	480,953	446,137	641,151	585,568	423	125	1,365,811	1,250,179
1881	183,419	171,149	372,197	346,968	568,509	516,852	245	45	1,124,270	1,035,014

TABLE B.—COAL TRADE BY COUNTIES.

	CUMBERLAND.		PICTOU.		CAPE BRETON.		OTHER COUNTIES.		TOTALS.		Grand Total.
	Round.	Slack.	Round.	Slack.	Round.	Slack.	Round.	Slack.	Round.	Slack.	
Nova Scotia											
Land Sales.....	24,977	29,670	116,187	86,230	2,099	7,312	.....	.....	143,263	123,212	266,475
Sea borne	4,279	576	41,825	18,538	153,210	8,147	.....	.....	199,314	27,261	226,575
Nova Scotia, total	29,256	30,246	158,012	104,768	155,309	15,459	.....	.....	342,577	150,473	493,050
New Brunswick	58,062	35,662	23,286	1,947	39,011	452	.....	.....	120,359	38,061	158,420
Newfoundland .....	.....	.....	2,143	930	82,605	538	.....	.....	84,748	1,468	86,216
P. E. Island .....	.....	.....	7,681	23,662	15,186	3,870	.....	.....	22,867	27,532	50,399
Quebec	68,516	35,727	138,283	1,651	143,630	8,975	.....	.....	350,429	46,353	396,782
West Indies	9	64	529	84	8,669	240	.....	.....	9,207	388	9,595
United States	156	707	269	818	12,571	49,994	.....	.....	12,996	51,519	64,515
Other Countries .....	.....	.....	106	12	2,229	326	.....	.....	2,335	338	2,673
Total	155,999	102,406	330,309	133,872	459,210	79,854	.....	.....	945,518	316,132	1,261,650
1883	152,453	69,894	319,859	141,950	543,419	69,195	687	66	1,016,418	281,105	1,297,523
1882	151,281	67,068	329,350	116,787	522,325	63,245	125	.....	1,003,079	247,100	1,250,179
1881	127,756	49,413	257,573	89,395	446,649	70,203	45	.....	826,003	209,011	1,035,014

COAL.—SALES.

MARKETS.	1st Quarter.	2nd Quarter.	3rd Quarter.	4th Quarter.	Year 1884.	Year 1883.
N. Scotia.						
Land Sales.	76,166	65,434	45,673	79,202	266,475	259,266
Sea borne..	4,775	53,899	92,115	75,786	226,575	212,061
N. Scotia—Tl	80,941	119,333	137,788	154,988	493,050	471,327
N. Brunswick	26,878	37,036	52,782	41,714	158,420	167,740
Newf'd	1,170	16,479	41,024	27,543	86,216	61,678
P. E. Island..	.....	11,200	26,661	12,538	50,399	48,088
Quebec	27,007	105,229	190,631	73,915	396,782	410,605
West Indies..	2,128	923	1,554	4,990	9,595	31,860
United States.	179	17,715	35,931	10,690	64,515	102,755
Other Countries ...	.....	.....	230	2,443	2,673	3,470
Total....	138,303	307,915	486,601	328,821	1,261,650	1,297,523
1883..	141,994	325,153	498,913	331,463	1,297,523	1,297,523
1882..	121,898	256,987	494,038	337,256	1,250,179	1,250,179

COAL—GENERAL STATEMENT.

1884.	Produce.	Sales.	Colliery Consumption.
1st Quarter.....tons	208,062	138,303	32,671
2nd Quarter..... "	365,327	307,915	26,084
3rd Quarter..... "	463,653	486,601	26,284
4th Quarter..... "	352,253	328,831	31,730
Total.....	1,389,295	1,261,650	116,769
1883.....	1,422,553	1,297,523	111,949
1882.....	1,365,811	1,250,179	111,381
1881.....	1,124,270	1,035,114	107,888

COAL PRODUCE OF NOVA SCOTIA DURING THE YEAR ENDED DECEMBER 31st, 1884.

COLLIERTIES.	SEAMS.	PRODUCE.	SALES.			COLLIERY CONSUMPTION.			
			Paying Royalty.	Free.	Total.	Per cent.	Engines.	Workmen.	Per cent.
CUMBERLAND COUNTY.									
Chignecto	North Seam	11,644	8,358	1,343	9,701	84	1,780	349	18
Joggins	Joggins	25,034	19,795	2,994	22,789	92	1,326	297	6
Maccan .....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Milner .....	.....	155	48	20	68	44	.....	.....	.....
Minudie .....	.....	10,023	7,722	1,736	9,458	94	460	182	6
Scotia	North Seam and Main ..	609	463	93	556	91	.....	13	.....
Springhill	Black and South	232,481	119,613	96,220	215,833	93	11,127	2,888	6
PICTOU COUNTY.									
Acadia	Acadia Seam	115,451	69,114	38,475	107,589	94	5,893	2,191	7
Albion	Third and McGregor	201,557	120,513	54,688	175,201	86	10,052	4,462	7
Intercolonial	Acadia	120,656	82,360	30,334	112,694	93	6,060	3,182	7
Vale	McBean and Greener ..	73,529	58,322	10,375	68,697	92	9,744	1,140	15
CAPE BRETON COUNTY.									
Barasois	Lingan Main Seam	76	76	.....	76	100	.....	.....	.....
Blockhouse	Blockhouse	23,668	19,583	2	19,585	82	2,658	1,485	17
Bridgeport	Phelan	3,115	3,009	36	3,045	97	38	55	3
Caledonia	Phelan	69,461	49,054	16,386	65,440	94	937	1,094	2
Glace Bay	Harbor	36,138	29,483	3,270	32,753	91	1,600	1,994	9
Gowrie	McAulay	89,384	66,362	15,978	82,340	92	2,321	1,606	4
Ingraham .....	.....	200	90	.....	90	45	.....	30	15
International	Harbor	87,216	69,339	11,459	8,798	93	3,600	1,528	4
Lingan	Lingan	23,404	20,061	810	20,871	81	1,916	1,391	14
Ontario	Phelan	5,890	5,345	370	5,715	97	598	443	17
Reserve	Phelan	96,114	71,088	15,462	86,550	90	3,226	2,794	6
Sydney	Sydney Main	149,378	116,273	15,120	131,393	85	15,610	7,776	15
Victoria	Victoria	14,112	9,447	961	10,408	73	2,223	700	20
1,389,295			945,518	316,132	1,261,650	.....	81,169	35,600	.....

COLLIERY CONSTRUCTION ACCOUNT.—1884.

COLLIERIES.	Shafts.	Slopes.	Adits.	Machinery	Colliery Build-ings.	Dwel-lings.	Surface Works.	Railways.	Wharves.	Prospect-ing.	Total.
CUMBERLAND Co.											
Chignecto	\$120 00	617 00	410 00	.....	.....	.....	.....	.....	.....	.....	1147 00
Joggins .....	.....	.....	.....	.....	200 00	.....	.....	.....	.....	.....	200 00
Maccan	150 00	500 00	200 00	600 00	200 00	250 00	250 00	.....	.....	260 00	2410 00
Miner .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Minudie .....	.....	.....	125 00	1200 00	500 00	2300 00	.....	.....	200 00	.....	4325 00
Spring Hill .....	.....	6371 00	.....	7329 00	100 00	880 00	1478 00	.....	.....	.....	16158 00
Scotia .....	.....	460 00	184 00	.....	.....	.....	.....	.....	.....	.....	644 00
PICOU Co.											
Acadia .....	.....	.....	.....	5904 00	.....	.....	.....	.....	.....	.....	5904 00
Albion .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Intercolonial .....	.....	.....	.....	10526 00	414 00	.....	.....	.....	.....	.....	10940 00
Vale .....	.....	4600 00	.....	.....	.....	.....	500 00	.....	.....	.....	5100 00
CAPE BRETON Co.											
Barasois .....	.....	655 00	.....	75 00	120 00	.....	94 00	.....	.....	.....	944 00
Block House .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Bridgeport	78 00	.....	92 00	160 00	90 00	1880 00	10 00	1800 00	200 00	.....	4310 00
Caledonia .....	.....	.....	842 00	.....	.....	1100 00	.....	1340 00	7117 00	.....	10399 00
Glance Bay .....	.....	.....	154 00	.....	.....	.....	.....	.....	.....	.....	154 00
Ingraham	114 00	.....	.....	.....	50 00	.....	.....	.....	.....	435 00	599 00
Gowrie .....	.....	.....	1970 00	.....	.....	.....	.....	.....	.....	.....	1970 00
International .....	.....	.....	.....	.....	1057 00	.....	.....	.....	.....	.....	1057 00
Lingan .....	.....	.....	837 00	.....	.....	.....	.....	.....	.....	.....	837 00
Ontario .....	.....	.....	23 00	100 00	.....	.....	.....	.....	.....	.....	123 00
Reserve .....	.....	327 00	596 00	2971 00	3123 00	673 00	416 00	142 00	.....	.....	8248 00
Sydney Mines .....	.....	.....	.....	.....	491 00	889 00	.....	.....	.....	.....	1380 00
Victoria .....	.....	5730 00	5382 00	1852 00	260 00	1420 00	870 00	1120 00	3035 00	.....	20119 00
Total	462 00	19260 00	11265 00	30717 00	6605 00	9392 00	3618 00	4402 00	10552 00	695 00	96968 00

MINES REPORT.

Statement of the Number and Classes of Men employed, and average results of each Colliery, during the year ended December 31st, 1884.

COLLIERIES.	UNDERGROUND.				SURFACE.				CONSTRUCTION.		TOTAL.		Average No. of Days per Person.		Average tons per cutter.	Average quantity raised per day, tons.	HORSES.		PITS WORKED
	Skilled Laborers.	Laborers.	Boys.	Days' Labor.	Mechanics.	Laborers.	Boys.	Days' Labor.	Persons.	Days' Labor.	Persons.	Underground.	Surface.	Above.			Below.		
CUMBERLAND Co.																			
Chignecto	23	6	7	7126	5	8	2	4557	...	...	51	11683	197	303	506	5	136	1	85
Joggins	50	..	11	11113	13	20	5	9043	3	79	102	20235	182	237	500	2	122	3	205
Minudie	22	4	1	5101	5	9	3	4195	3	698	47	9994	188	246	455	1	40	2	249
Scotia .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Spring Hill	275	129	86	396801	46	83	15	35424	28	7421	662	439646	809	246	845	2	873	17	266
PICOU Co.																			
Acadia	88	81	25	47611	26	39	8	14806	...	26	261	62443	245	220	1211	4	467	5	247
Albion	256	139	68	195397	76	126	40	72913	...	...	705	268310	422	301	787	2	730	16	276
Intercolonial	135	52	73	61770	35	60	10	27706	6	1698	371	91174	237	263	893	3	492	8	245
Vale	148	47	15	46637	40	45	7	31432	...	...	302	78069	222	341	496	1	245	7	299
CAPE BRETON Co.																			
Block House	40	5	20	8587	17	26	5	12511	...	...	113	21098	132	260	591	4	164	10	144
Bridgeport	7	..	1	1602	1	9	2	1832	12	1728	32	5162	200	152	445	4	34	1	90
Caledonia	87	5	23	20183	10	22	8	10255	18	5143	173	35581	175	256	798	5	460	14	151
Glouce Bay	82	7	14	11510	28	26	3	14040	...	...	160	25550	111	246	443	2	228	3	158
Gowrie	91	11	31	29293	17	36	12	16760	...	...	198	46053	220	257	982	5	538	8	166
Ingraham	2	..	..	220	1	..	..	210	4	1295	7	1725	110	210	100	2	5	..	40
International	349	83	115	38534	73	153	10	24269	14	360	797	63163	70	102	249	2	855	4	102
Lingan	48	6	12	14117	2	25	7	8108	...	...	100	22225	213	238	487	3	149	3	157
Ontario	15	2	3	2783	6	5	3	2578	...	...	34	5361	139	184	392	..	..	1	..
Reserve	128	16	37	32872	19	25	8	13278	29	8118	262	54268	420	255	782	4	513	7	187
Sydney	211	34	81	76134	63	97	31	52766	...	...	517	128900	233	276	707	4	913	15	164
Victoria	33	23	2	14041	11	28	2	12831	20	6076	119	32948	242	312	427	1	46	3	309
	2090	650	625	1021432	488	852	181	369514	127	32642	5013	1423588	238	245	563	2	...	128	196

Nova Scotia Coal Sales, from 1785 to 1884 (inclusive).

Year.	Sales.	Total.	Year.	Sales.	Total.
1785	1,668	14,349	1841	148,298	Forw'd 1,208,177
1786	2,000		1842	129,708	
1787	10,681		1843	105,161	
1788			1844	108,482	
1789			1845	150,674	
1790			1846	147,506	
1791	2,670		1847	201,650	
1792	2,143		1848	187,643	
1793	1,926		1849	174,592	
1794	4,405		1850	180,084	
1795	5,320	51,048	1851	153,499	1,533,798
1796	5,249		1852	189,076	
1797	6,039		1853	217,426	
1798	5,948		1854	234,312	
1799	8,947		1855	238,215	
1800	8,401		1856	253,492	
1801	5,775		1857	294,198	
1802	7,769		1858	226,725	
1803	6,601		1859	270,293	
1804	5,976		1860	322,593	
1805	10,130	70,452	1861	326,429	2,399,829
1806	4,938		1862	395,637	
1807	5,119		1863	429,351	
1808	6,616		1864	576,935	
1809	8,919		1865	635,586	
1810	8,609		1866	558,520	
1811	8,516		1867	471,185	
1812	9,570		1868	453,624	
1813	9,744		1869	511,795	
1814	9,866		1870	568,277	
1815	9,336	91,527	1871	596,418	4,927,339
1816	8,619		1872	785,914	
1817	9,284		1873	881,106	
1818	7,920		1874	749,127	
1819	8,692		1875	706,795	
1820	9,980		1876	634,207	
1821	11,388		1877	697,065	
1822	7,512		1878	693,511	
1823	27,000		1879	688,628	
1824			1880	954,659	
1825		1881	1,035,014		
1826		1882	1,250,179		
1827	12,600	1883	1,297,523	7,377,428	
1828	12,149	1884	1,261,650		
1829	20,967	Total....	22,290,937		
1830	21,935				
1831	27,269	140,820			4,844,366
1832	37,170				
1833	50,396				
1834	64,743				
1835	50,813				
1836	56,434				
1837	107,593				
1838	118,942				
1839	106,730				
1840	145,962		839,981		
	101,198				

SUMMARY.

1785 to 1790.....	14,349	1831 to 1840.....	839,981
1791 to 1800.....	51,048	1841 to 1850.....	1,533,798
1801 to 1810.....	70,452	1851 to 1860.....	2,399,829
1811 to 1820.....	91,527	1861 to 1870.....	4,927,339
1821 to 1830.....	140,820	1871 to 1880.....	7,377,428

COAL.

NOVA SCOTIA EXPORTED TO THE UNITED STATES.

Years.	Tons.	Duty.	Years.	Tons.	Duty.
1850	118,173	24 ad.	1868	228,132	\$1.25
1851	116,274	"	1869	257,485	"
1852	87,542	"	1870	168,180	"
1853	120,764	"	1871	165,431	"
1854	139,125	Free	1872	154,092	.75
1855	103,222	"	1873	264,760	"
1856	126,152	"	1874	138,335	"
1857	123,335	"	1875	89,746	"
1858	186,743	"	1876	71,634	"
1859	122,720	"	1877	118,216	"
1860	149,289	"	1878	88,495	"
1861	204,457	"	1879	51,641	"
1862	192,612	"	1880	123,423	"
1863	282,775	"	1881	113,728	"
1864	347,594	"	1882	99,302	"
1865	465,194	"	1883	102,755	"
1866	404,252	"	1884	64,515	"
1867	338,492	\$1.25			

NOTE.—The quantities given for the years 1850 to 1872 are on the authority of the Board of Trade, Philadelphia, and are probably under estimated.

GOLD.—GENERAL STATEMENT FOR THE YEAR 1884.

Shewing the number of Mines, Days' Labor performed, quantities of Quartz crushed, yield of Gold, &c., for the year ended December 31st, 1884.

DISTRICTS.	Number of Mines.	Days' Labor.	Mills Employed.	Steam Power.	Water Power.	Tons of Quartz, &c. Crushed.	Yield per Ton.		Maximum Yield per Ton.		Total Yield of Gold		Average yield per man per day for twelve months at \$18.00 per ounce.
							Oz.	Dwt. Gr.	Oz.	Dwt. Gr.	Oz.	Dwt. Gr.	
Caribou	3	7499	2	1	1	1559	0	12 9	2	10 0	966	19 22	2.32
Darr's Hill	1	24935	1	...	1	9799	0	6 20	0	9 14	3397	0 0	2.45
Fifteen Mile Stream	1	1573	1	...	1	107	0	16 13	1	5 21	88	14 3	1.00
Montagu	2	4469	2	2	...	539	1	7 8	4	6 0	736	12 23	2.90
Oldham	2	3011	2	1	1	921	0	17 21	2	3 12	824	15 12	4.80
Renfrew	1	3170	1	...	1	1679	0	6 18	1	0 0	569	18 0	3.20
Sherbrooke	8	22142	2	1	1	3268	0	16 7	6	14 12	2668	11 0	2.10
Stormont	1	7337	1	1	...	913	2	8 10	3	17 5	2212	8 1	5.40
Tangier	1	13589	2	2	...	1330	0	14 0	0	18 18	924	2 19	1.10
Uniacke	2	4898	4	3	1	2235	0	19 4	1	4 5	1140	6 2	4.20
Waverly	1	344	2	1	1	10	1	7 0	1	7 0	1	7 0	...
Unproclaimed, &c.	4	25120	7	3	4	2826	0	18 0	5	0 0	2548	19 0	1.80
Total	27	118087	27	15	12	25186	0	12 18	6	14 12	16079	14 10	2.40

MONTHLY STATEMENT FROM EACH GOLD DISTRICT.

MONTH.	CARRIBOU.							DARR'S HILL.							FOURTEEN MILE STREAM.						
	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Grs.	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Grs.	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Grs.
January.....	2	220	9	23	30	15	0	1	1650	66	780	247	10	0	1	95	4	41	20	2	2
February.....	3	550	22	75	78	12	0	1	1900	76	625	224	0	0	1	75	3	....	...	...	...
March.....	3	695	28	125	84	..	..	1	2264	90	600	209	0	0	1	40	2	....	...	...	...
April.....	3	455	18	227	67	4	18	1	2259	90	700	245	0	0	1	115	5	....	...	...	...
May.....	3	587	23	251	61	3	23	1	1425	57	756	298	10	0	1	126	5	....	...	...	...
June.....	4	737	30	109	38	17	10	1	1960	78	988	263	0	0	1	89	3	....	...	...	...
July.....	3	709	28	127	116	1	4	1	2207	88	900	215	0	0	1	155	6	....	...	...	...
August.....	2	581	23	62	27	2	16	1	2300	90	900	275	0	0	1	167	6	11	14	5	0
September.....	3	816	32	101	67	16	0	1	1750	70	950	485	0	0	1	197	7	....	...	...	...
October.....	3	674	27	87	100	5	0	1	2260	90	950	328	0	0	1	283	11	27	26	0	0
November.....	2	813	32	255	212	2	16	1	2490	100	915	254	0	0	2	201	8	28	28	7	1
December.....	2	662	26	117	82	19	7	1	2470	98	735	353	0	0	2	30	2	....	...	...	...
	3	7499	...	1559	966	19	22	1	24935	...	9799	3397	0	0	1	1573	...	107	88	14	3

MONTHLY STATEMENT FROM EACH GOLD DISTRICT.—(CONTINUED.)

MONTH.	MONTAGU.						OLDHAM.						RENFREW.								
	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Grs.	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Grs.	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Grs.
January	2	204	8	...	..	..	..	2	433	17	44	43	7	18	1	...	...	125	35	14	0
February	2	159	7	40	42	7	0	2	303	14	101	112	5	16	1	...	...	120	3	16	0
March	1	332	13	18	9	1	6	2	214	9	53	52	16	0	1	...	...	208	56	12	0
April	1	228	9	71	8	8	0	2	205	8	46	53	0	12	1	...	...	...	..	..	..
May	1	317	12	43	5	9	0	3	269	11	88	63	13	2	1	...	...	280	87	3	0
June	2	369	14	...	..	..	..	3	357	14	97	66	7	6	1	...	...	216	98	14	0
July	2	381	15	46	4	17	17	2	212	8	86	77	8	0	2	625	25	137	58	12	0
August	2	749	30	24	42	8	0	3	185	7	99	76	10	11	2	710	30	...	..	..	..
September	2	1059	42	53	227	18	0	2	195	4	32	11	15	4	2	690	28	...	..	..	..
October	1	260	10	86	115	13	0	2	50	2	20	9	3	7	2	327	13	...	..	..	..
November	1	252	10	88	137	7	0	2	236	10	133	148	8	14	2	359	14	200	77	6	0
December	1	129	5	70	143	4	0	2	352	14	121	109	19	18	2	459	18	393	152	1	0
Totals	1	4469	...	539	736	12	23	2	3011	...	920	824	15	12	1	3170	...	1679	569	18	0

MONTHLY STATEMENT FROM EACH GOLD DISTRICT.—(CONTINUED.)

MONTH.	SHERBROOKE.						STORMONT.						TANGIER.								
	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Grs.	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Grs.	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Grs.
January	7	2268	91	500	252	9	0	1	675	27	64	208	3	0	2	1034	41	200	179	6	0
February	7	2050	82	282	193	17	0	1	630	25	65	229	10	0	2	391	16	40	12	2	0
March	8	1976	79	269	380	4	0	1	720	29	71	163	4	0	2	1635	65	223	172	5	18
April.	6	1944	78	172	349	15	0	1	680	27	75	181	10	0	2	1093	44	10	6	6	12
May	8	2079	82	206	224	2	0	1	585	23	75	197	7	0	2	862	34	115	108	0	0
June	10	2100	84	195	285	11	0	1	572	23	65	151	10	0	2	1097	44	78	53	17	15
July	9	1890	76	261	238	13	0	1	605	24	97	172	4	0	1	1369	54	...	...	...	...
August	9	1560	62	339	213	3	0	1	560	22	72	149	17	0	1	1290	51	224	138	10	0
September	9	1352	54	329	99	10	0	1	585	23	47	182	10	0	1	1447	60	125	74	0	0
October	10	1728	69	281	100	11	0	1	619	25	113	168	11	20	1	1381	55	147	74	5	0
November	9	1575	63	205	157	15	0	1	598	24	71	185	15	0	1	916	36	124	77	16	5
December	6	1620	65	229	173	1	0	1	508	20	98	222	6	5	1	1074	43	44	27	13	17
Totals	8	22142	...	3268	2668	11	0	1	7337	...	913	2212	8	1	1	13589	...	1330	924	2	1

MONTHLY STATEMENT FROM EACH GOLD DISTRICT—(CONTINUED).

MONTH.	UNTAQUE.							WAVERLY.							UNPROCLAIMED.						
	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Grs.	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Grs.	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Grs.
January.....	3	499	20	222	135	18	10	1	48	..	...	..	..	..	3	1547	62	192	203	18	0
February.....	3	441	20	85	75	7	10	1	34	..	...	..	..	..	3	1561	62	183	191	11	0
March.....	4	626	25	333	131	15	6	1	74	..	...	..	..	..	3	1276	51	233	162	19	0
April.....	2	345	13	175	114	0	5	..	.....	..	...	..	..	..	4	2076	83	197	177	12	0
May.....	2	392	16	187	116	2	19	1	12	..	...	..	..	..	4	2486	99	112	91	12	0
June.....	2	320	12	206	53	11	18	1	32	..	...	..	..	..	4	2636	105	208	192	15	0
July.....	2	275	11	148	65	14	15	1	8	..	...	..	..	..	3	2135	85	227	201	19	0
August.....	3	418	16	275	110	11	10	2	71	..	10	1	7	0	3	2095	83	229	252	0	0
September.....	3	482	20	147	128	10	20	2	75	..	...	..	..	..	3	2112	84	273	170	4	0
October.....	3	440	19	142	68	4	18	..	.....	..	...	..	..	..	5	2292	91	307	148	5	0
November.....	2	350	14	238	107	2	23	..	.....	..	...	..	..	..	5	2444	99	366	388	19	0
December.....	3	310	11	77	33	5	16	..	.....	..	...	..	..	..	5	2460	99	299	361	5	0
	2	4898	...	2235	1140	6	2	1	344	..	10	1	7	0	4	25120	..	2826	2548	19	0

GOLD.

GENERAL ANNUAL SUMMARY.

YEAR.	Total ounces of Gold extracted.			Stuff Crushed.	Yield per Ton of 2,000 lbs.	Total Days' Labor.	Average earnings per man per day and year, at 300 working days, \$18 per oz.	
	Oz.	Dwt.	Gr.	Tons.	Oz. Dwt. Gr.		A day.	A year.
1862	7,275			6,473	1 2 11	156,000	\$ 83	\$249
1863	14,001	14	17	17,002	16 11	273,264	92	276
1864	20,022	18	13	21,434	18 16	252,720	1 42	426
1865	25,454	4	8	24,423	1 0 20	212,966	2 15	645
1866	25,204	13	2	32,161	15 2	211,796	2 14	642
1867	27,314	11	11	31,386	17 9	218,894	2 24	672
1868	20,541	6	10	32,262	12 17	241,462	1 53	459
1869	17,868	0	19	35,147	10 4	210,938	1 52	456
1870	19,866	5	5	30,829	12 21	173,680	2 05	615
1871	19,227	7	4	30,791	12 11	162,992	2 12	636
1872	13,094	17	6	17,093	15 7	112,476	2 09	627
1873	11,852	7	19	17,708	13 9	93,570	2 28	684
1874	9,140	13	9	13,844	13 5	77,246	2 12	636
1875	11,208	14	19	14,810	15 4	91,698	2 20	660
1876	12,038	13	18	15,490	15 13	111,304	1 94	582
1877	16,882	6	1	17,369	19 10	123,565	2 46	738
1878	12,577	1	22	17,990	13 23	110,422	2 05	615
1879	13,801	8	10	15,936	17 8	92,002	2 34	702
1880	13,234	0	4	14,037	18 20	103,826	2 18	54
1881	10,756	13	2	15,556	12 20	126,308	1 52	456
1882	14,107	3	20	22,081	12 18	106,884	2 37	711
1883	15,446	9	23	25,954	10 21	97,733	2 84	862
1884	16,059	18	17	25,147	12 18	118,087	2 40	720
Total.	366,976	11	19	495,923	.....	3,480,193	.....	.....

INTERCOLONIAL RAILWAY.

Statement shewing the quantities, in tons, of the different kinds of Coal received from the various Mines for the use of the Intercolonial Railway, during the year 1884.

MONTH.	ACADIA.	ALBION.			CHIGNECTO.	DRUMMOND.	JOGGINS.	SPRING HILL.		Vale.
		Round.	Small.	Coke.				Round.	Run of Mine.	
January.....	.....	2004	200	.....	2054	.....	.....	8041	.....	.....
February.....	.....	2382	45	8	2798	.....	.....	8108	.....	210
March.....	32	2296	31	.....	837	93	.....	5557	16	27
April.....	11	3160	73	.....	.....	.....	.....	2751	6427	28
May.....	.....	1567	98	.....	.....	.....	.....	.....	6530	.....
June.....	.....	1354	35	20	.....	.....	.....	91	8207	.....
July.....	11	1317	112	.....	.....	.....	40	108	5749	3296
August.....	.....	1048	151	.....	.....	.....	.....	54	5484	5511
September.....	.....	594	53	.....	.....	.....	.....	140	1273	5338
October.....	.....	3016	165	.....	.....	.....	.....	79	1978	7309
November.....	.....	4505	21	14	.....	.....	.....	403	4638	5929
December.....	42	4145	24	.....	.....	.....	.....	5	2711	6258
	96	27388	1008	42	5689	93	40	25337	43013	33866

INTERCOLONIAL RAILWAY.

STATEMENT, shewing the number of tons of Coal received at the following Stations from Mines in Nova Scotia for the year ending the 31st December, 1884.

STATIONS.	No. TONS.	STATIONS.	No. TONS.
Halifax	57480	Bic	4
Bedford	458	Nappan	50
Windsor Junction	4830	Amherst	3631
Wellington	76	Aulac	240
Enfield	294	Sackville	1871
Elmsdale	158	Dorchester	1057
Milford	41	Memramcook	475
Shubenacadie	330	Painsec	8
Stewiacke	516	Shediac	268
Brookfield	108	Point du Chene	16
Truro	6930	Moncton	14612
Valley	32	Salisbury	1844
Riversdale	6	Petitcodiac	105
West River	24	Penobsquis	1666
Hopewell	1470	Sussex	520
New Glasgow	20729	Apohaqui	6
Pictou Landing	43482	Norton	38
Belmont	35	Passakeag	26
De Bert	6	Hampton	713
East Mines	48	Rothsay	156
Londonderry	77140	Cold Brook	3941
Wentworth	73	St. John	15295
Greenville	40	Berry's Mills	26
Thompson	6	Weldford	48
Oxford	407	Kent Junction	235
River Philip	19	Chatham Junction	205
Athol	4	Derby	28
Maccan	90	Newcastle	110
Bathurst	136	St. Simon	4
Petit Roche	8	River du Loup	117
Jacquet River	10	Ste. Helene	24
New Mills	37	St. Philippe	10
Charlo	16	Ste. Anne	4
Dalhousie	79	St. Roche	44
Campbellton	322	St. Jean, P. Joli	12
Cedar Hall	85	Cape St. Ignace	10
St. Octave	12	St. Charles Junction	35
Ste. Flavie	35	Chaudiere (Local)	39596
Ste. Luce	30	" (Points West)	58040
Rimouski	91	Point Levi	15262
			376049

From the following Stations:

STATIONS.	No. TONS.
Drummond	41373
Hopewell	10548
Stellarton	146888
New Glasgow	26096
Spring Hill	148155
Maccan	2989
Total.....	376049

MINERALS OTHER THAN THOSE LEASED FROM THE CROWN.

† GYPSUM.

Windsor	Tons.	80,072	Value	\$80,072
Cheverie	"	23,177	"	16,401
Walton	"	4,304	"	3,456
Hantsport	"	350	"	350
St. Ann's, C. B.	"	2,795	"	2,795
Arichat, "	"	370	"	370
	"	111,068		\$103,444

† BUILDING STONE.

Pictou	Tons.	170	Value	\$1,530
Pugwash	"	580	"	
Antigonish	"	30	"	120
	"	720		

† MANGANESE.

Tenny Cape	Tons.	126	Value	
Windsor	"	5 $\frac{1}{2}$	"	550
Cheverie	"	2	"	180
Walton	"	89 $\frac{1}{4}$	"	8,430
East Mountain, Colchester Co.	"	30	"	2,700
Loch Lomond, C. B.	"	50	"	
	"	302 $\frac{3}{4}$		

GRINDSTONES, ETC.

Lower Cove	} Grindstones	Tons.	2,200	Value	\$26,400
A. Seaman & Co.		Scythestones Boxes.	2,000	"	2,000
					\$28,400

LIMESTONE.

†Pugwash	Tons.	301	Value	\$300
†St. Peters	"	4,267	"	
†Londonderry (ankerite)...	"	5,799	"	
†Brookfield	"	15,000 ?	"	
		<u>25,567</u>		

ANTIMONY.

†Rawdon Mine.....	Tons.	600
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MOULDING SAND.

†Windsor	Tons.	175	Value	\$265
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COPPER ORE.

Coxheath.....	110 Tons.
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IRON MINING.

Londonderry.....	54,885 tons
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AVERAGE FORCE EMPLOYED DAILY.

Skilled workmen :

		Days Worked.
Under-ground.....	83	20,970
Above-ground.....	19	5,774
Unskilled labor :		
Above-ground.....	28	7,236
Under-ground.....	86	19,447
Total.....	<u>216</u>	<u>53,427</u>

†Amounts exported. The home consumption of Gypsum, Limestone, Moulding Sand, and Building Stone being unknown.

‡Used as flux.

EXPORTS FROM HALIFAX.

Produce of the Mine year ending Dec. 31, 1884.

	Quantity.	Value.
Gold .....	....	\$307,135
Antimony.....	Tons. 463	17,865
Oil Coal	Gals. 1,978	372
Salt.....	Bush. 39,421	8,515
Other Minerals .....	....	1,689
		<hr/> \$335,574

FINANCIAL STATEMENT.—GOLD, &c.
Mines Department for Twelve Months ended 31st December, 1884.

DISTRICTS.	RECEIPTS.			EXPENDITURE.				
	Rents.	Royalty.	Total.	Return Rents.	Royalty.	Royalty Commiss'n.	Salaries and Surveys.	Total.
Caribou.....	\$ 24 00	\$ 353 40	\$ 377 40	\$.....	\$.....	\$ 16 45	\$.....	\$ 16 45
Darr's Hill.....	.....	1148 22	1148 22	.....	.....	.....	.....	.....
Fifteen Mile Stream.....	24 00	150 52	174 52	.....	144 38	31	25 50	170 19
Gay's River.....	4 00	.....	4 00	.....	.....	.....	.....	.....
Lawrencetown.....	.....	82	82	.....	.....	.....	.....	.....
Montagu.....	70 00	209 90	279 90	.....	.....	.....	7 50	7 50
Oldham.....	60 00	305 49	365 49	.....	.....	16 58	28 00	44 58
Ovens.....	18 00	.....	18 00	2 00	.....	.....	127 00	129 00
Renfrew.....	20 00	36 52	56 52	.....	.....	1 83	89 00	90 83
Sherbrooke.....	34 00	981 77	1015 77	.....	.....	52 00	399 99	451 99
Stormont.....	112 00	922 93	1034 93	.....	.....	46 14	.....	46 14
Tangier.....	59 00	469 42	528 42	.....	.....	10 40	.....	10 40
Uniacke.....	20 00	766 82	786 82	.....	.....	2 50	130 00	132 50
Waverly.....	270 00	27	270 27	.....	.....	.....	4 00	4 00
Wine Harbor.....	24 00	.....	24 00	.....	.....	.....	.....	.....
Unproclaimed.....	1384 00	1370 09	2754 09	20 00	882 52	17 15	567 87	1487 54
Prospecting Licenses.....	.....	.....	2547 99	.....	.....	.....	.....	210 00*
	\$ 2123 00	\$6716 17	\$11387 16	\$22 00	1026 90	163 36	1378 86	\$ 2801 12

* Return.

OTHER THAN GOLD.

Mines Department for twelve months ended 31st December, 1884.

COUNTIES.	RECEIPTS.				EXPENDITURE.		
	Licenses to Search.	Licenses to Work.	Royalty.	Totals.	Ret'n Licenses to Search.	Salaries and Surveys.	Totals.
Annapolis	\$ 40 00	\$ 50 00	.....	\$ 90 00	.....	.....	.....
Antigonish	200 00	50 00	.....	250 00	.....	.....	.....
Cape Breton	200 00	125 00	\$52657 74	52982 74	.....	\$1024 15	\$ 1024 15
Colchester	80 00	.....	.....	80 00	.....	.....	.....
Cumberland	360 00	200 00	1013 81	1573 81	.....	730 00	730 00
Digby	40 00	.....	.....	40 00	.....	.....	.....
Guysborough	40 00	.....	.....	40 00	.....	.....	.....
Halifax	40 00	.....	.....	40 00	.....	.....	.....
Hants	80 00	.....	.....	80 00	.....	.....	.....
Inverness	240 00	50 00	.....	290 00	\$ 20 00	.....	20 00
Kings	20 00	.....	.....	20 00	.....	.....	.....
Pictou	420 00	475 00	32605 65	33500 65	20 00	25 00	45 00
Richmond	100 00	100 00	.....	200 00	.....	.....	.....
Victoria	60 00	.....	.....	60 00	20 00	.....	20 00
Yarmouth	20 00	.....	.....	20 00	.....	.....	.....
Examinations .....	.....	.....	.....	24 00	.....	.....	92 63
	1940 00	1050 00	86277 20	89291 20	60 00	1779 15	1931 78

ABSTRACT ACCOUNT.

Receipts and Expenditure for the Twelve Months ended 31st December, 1884.

RECEIPTS.	EXPENDITURE.
Licenses to Search	Return Licenses to Search
" " Work	Salaries and Surveys.....
Royalty	Examinations
Examinations	
	Return Rents
	" Royalty
	Royalty Commission
	Salaries and Surveys.....
	Return Prospecting Licenses.....
	General Expenses.....
	Postage
	Stationery and Printing

REPORT
OF THE
DEPARTMENT OF MINES,
NOVA SCOTIA,
FOR THE YEAR 1885.



HALIFAX, N. S. :
COMMISSIONER OF PUBLIC WORKS AND MINES, QUEEN'S PRINTER.
1886.

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DEPARTMENT OF MINES.

REPORT FOR THE YEAR 1885.

*To His Honor Matthew H. Richey, Esq., Lieutenant-Governor of the
Province of Nova Scotia, &c., &c., &c.*

MAY IT PLEASE YOUR HONOR,—

I respectfully present herewith to Your Honor the Annual Report of the Inspector of Mines, containing an account of the mineral resources of the Province, and the progress of mining operations, together with statistical information compiled by him from official and other returns.

I remain,

Your Honor's obed't servant,

CHARLES E. CHURCH,

Commissioner of Public Works and Mines.

HALIFAX, February 16th, 1886.

REPORT

ON THE

MINES OF NOVA SCOTIA,

BY EDWIN GILPIN, JR., A.M., F.G.S., F.R.S.C.,

INSPECTOR OF MINES.

(Member of the North of England and the American Institutes of Mining Engineers.)

OFFICE OF INSPECTOR OF MINES,
HALIFAX, February 15th, 1886.

TO THE HONORABLE

CHARLES E. CHURCH, M. P. P., M. E. C.,

Commissioner of Public Works and Mines.

SIR,—I beg leave to submit the following report on the Mines and Mineral resources of Nova Scotia, and the progress of mining during the year 1885.

The following summary shows, so far as I have been able to learn, the mineral production of Nova Scotia during the year 1885, compared with that of the previous year :

	1884.	1885.
Gold Ounces....	16,079	22,203
Iron Ore.....Tons.....	54,885	48,129
Manganese Ore "	302	353½
Copper "....."	110	
Lead "....."	100	
Barytes "....."		300
Antimony "....."	600	*758
Coal raised....."	1,389,295	1,352,205
Gypsum"	111,068	87,644
Building stone....."	780	3,827
Coke made....."	40,085	30,185
Limestone"	25,567	16,429
Grindstones, etc....."	2,200	2,208

* Amount exported.

Through the kindness of the Collectors of Customs at the various ports of the Province, I am enabled to give further information under this head at the end of the report.

I also beg leave to enclose the reports of W. Madden, Jr., Esq., Deputy Inspector of Mines for the District of Cumberland, Colchester and Pictou Counties; and of Patrick Neville, Esq., Deputy Inspector of Mines for the Island of Cape Breton. These gentlemen have paid regular visits to the mines in their respective districts, and report that generally every attention is paid to the observance of the Mines Regulation Act. They have prepared for the report a table showing the number of tons of water raised from the mines last year compared with the official returns of the number of tons of coal raised. From these tables it would appear that 3,646,889 tons of water have been pumped, in order to permit the raising of 1,352,205 tons of coal. They have also prepared tables, giving the dimensions and duty of the pumps used at the various collieries, and these will, it is expected, be presented in the next annual report.

In September, the American Institute of Mining Engineers held their annual meeting in Halifax. Through the courtesy of the Minister of Railways, free passes were granted to the members over the Intercolonial Railway, and money grants to promote the objects of the session were given by the Dominion and by the Provincial Governments.

At the sessions many papers of interest were read, and excursions made on the harbor and to the New Albion Gold Mines at Montagu, etc. The citizens of Halifax materially promoted the success of the meeting by a reception and an excursion on the harbor.

After the conclusion of the meeting the members separated. One large party visited the Pictou coal mines, and by special trains, boats, etc., were afforded facilities for visiting the coal, iron, copper, and other mineral resources of Cape Breton. Another party visited the Londonderry iron mines, and the Spring Hill coal mines; while those whose time did not allow of any lengthened stay, returned by a special train through the Annapolis valley, visiting the Windsor plaster quarries, etc., on the way.

The visitors were much pleased and greatly impressed with the varied mineral resources of the Province; and the opportunities extended to them of becoming acquainted with our coal, gold and other ores will undoubtedly prove of benefit to us in the future. Their opinion of the Province may be gathered from the following quotation from observations on the meeting published by Dr. Raymond, Secretary of the American Institute of Mining Engineers:—"Nova Scotia has been treated with great partiality by nature, which has heaped upon it with great prodigal hand, the choicest treasures of her mysterious laboratory. Gold, the sorcerer that bewitches the world; coal, the mainspring of civilization; iron ore, manganese, gypsum, and many other useful minerals, are placed in large abundance within easy reach of man, in a fertile country with

wholesome climate. In their proximity to each other and to magnificent harbors, nature has provided all the natural elements of national wealth and prosperity. The artificial elements, capital and energy, only have to be added to secure for this favored land an enviable position among the nations of the earth."

The visit of these Engineers, many of whom are connected with the largest mining and mineral investment undertakings of the United States, will undoubtedly benefit us quite as much as their visit to Montreal a few years ago proved advantageous to that section of the Dominion, the result of which was speedily visible in a large investment of United States capital in the iron ore, phosphate, asbestos, and other mines of Quebec and Ontario.

The wisdom of the Provincial and Dominion Governments in facilitating their opportunities for seeing the country, were commented on by the Engineers, who arrived with an idea that the country was an inferior edition of the State of Maine, and left it impressed with the fact that it contained, in a small compass, unusually large stores of those minerals which nature seldom places in propinquity. The discussion of measures affecting our coal trade relations with the Atlantic ports of the United States cannot fail to be advanced by the experience of those who have personally seen the evidences of our ability to furnish cheap and good fuel to the iron and other manufacturing industries of the Eastern States, which are already dreading the gradual removal of these occupations to the cheap coal of the Western States.

MINERAL RESOURCES OF NOVA SCOTIA.

In the following remarks I have tried to give briefly, and as clearly as I could, an account of the value and extent of the mineral resources of Nova Scotia. I would refer those desiring more detailed information to the Reports of the Department of Mines, to Sir J. W. Dawson's "Acadian Geology," and to papers by the writer in the Transactions of the North of England Institute of Mining Engineers, the Transactions of the Nova Scotia Institute, etc.

It will be observed that we have in our Province coal, iron and gold, and the development of the two last named minerals will form an important page in our future history. Copper, manganese, antimony, barytes, gypsum, marble, etc., also occur in abundance, and have been worked to some extent.

Future researches will probably disclose other valuable minerals, thus the Precambrian rocks of Cape Breton, like their counter parts in Quebec and Ontario, may yield phosphates, plumbago, asbestos, etc., in addition to the iron and copper ores already known to exist in them.

These resources are being gradually developed, and few of the English colonies offer a more promising field to the miner and capitalist. The natural position of Nova Scotia projecting into the North Atlantic with fine harbors, cheap fuel, numerous minerals, its healthy climate and orderly population, and its nearness to England, all combine to forecast an important and prosperous future for it.

MINERALS OF NOVA SCOTIA.

COAL.

THE COAL FIELDS OF NOVA SCOTIA.

Nova Scotia coals belong entirely to the bituminous system of Dana, and may be subdivided into cooking, free burning, and carmel coals. It may be remarked that the coals of this country belong to the same geological horizon of the carboniferous system as those of England and the Eastern United States, and present many points of intimate connection in fossil remains and in the associated strata.

SYDNEY COAL FIELD.

This district occupies the eastern shore of Cape Breton County. Its land area is estimated at 200 square miles, and it now forms the rim of an extensive coal field extending under the Atlantic. Fortunately experience has proved that nearly all the seams can be followed in their subaqueous extension. Estimates based on the system of enquiry adopted by the Royal Commission on the duration of the coal supply of Great Britain, put the amount of available coal in these submarine areas, after making proper deductions for waste, etc., at not less than 2,000,000,000 tons.

The following section, taken in the Lingan district, will serve to show the thickness and relative positions of the best known seams :—

Seam.	Strata and Coal.	
	ft.	in.
Seam A.....	3	..
"	306	..
Carr	6	5
"	190	..
Barrasois, or Hub	12	1
"	379	3
Harbor, Victoria or Sydney	8	..
"	235	..
Seam D.....	3	..
"	78	..
North Head.....	4	..
"	75	..
McAuley, Phelan, or Lingan	8	..
"	95	..
Ross, or Emery	4	6
"	340	..
Gardener	4	9

The coal field is remarkably free from disturbances, etc., and Professor Lesley, in a report, dwells strongly on this point.

Nearly all the seams lie at easy angles, yield little water, and owing to the generally firm character of the roof, they can be mined with unusual cheapness and safety. So strongly marked is the

impermeable nature of the strata, that at a moderate depth the submarine workings are perfectly dry.

There are seams found underlying those given in the above section, and varying in thickness from two to eight feet, but in the presence of the seams cropping on the shore they have not hitherto attracted much attention.

The coals of this district are bituminous, and specially adapted for gas and coke making, and for steam purposes. The Sydney Mines coal is largely used in the Lower Provinces for domestic purposes. The gas values may be understood from the following test made of the Harbor seam coal:—

Gas, cubic feet per ton.....	10,000
Candle power	16
Coke, good, lbs.....	1,470

Official reports on this seam made to the Admiralty show that it contains 83.5 per centum of carbon, and that it is practically equal to Welsh steam coal. Trials made on H. M. S. *Gannet* show that when mixed with twice its weight of the best Welsh coal, a saving of 12 per cent over the Welsh coal alone was obtained. Practical tests made some years ago for the United States Naval Department, showed a practical evaporative power of 7.9 lbs. for the Sydney seam. Similar tests and trials of the other seams show equally good results, and Sydney Harbor has become a well-known port of call for steamers requiring bunker coal. Newfoundland sealing steamers prefer Cape Breton coal to all other owing to the rapidity with which it raises steam.

These coals have been largely used on Canadian railways, and are found to compare most favourably with the best imported coals, and in many cases are given the preference. As yet the slack coal has not been burned into coke except in small amounts for the local foundries, but considerable quantities are shipped to the United States, where an economical fuel is made by mixing it with the dust of anthracite coal for use under ordinary steam boilers. The contemplated establishment of large iron and copper works on Sydney Harbor will afford a near market for both slack and coke.

The following analyses will serve to show the general character of the seams of the district: *

Composition.	Name of Seam.		
	Sydney.	Phalen.	Harbor.
Moisture	1.260	.921	.80
Vol: Comb: Matt: Fast Coking.....	35.514	30.312	29.40
Fixed Carbon "	59.111	62.324	65.50
Vol: Comb: Matt: Slow Coking	33.840	28.625	27.85
Fixed Carbon "	60.785	64.021	67.05
Ash	4.115	6.433	4.30
Sulphur	1.705	1.105	1.29
Theo: Evaporative power	8.33	8.78	9.19

* The analyses of coals in this report are by the writer, and for full information on the compositions and values of Nova Scotian coals the reader may refer to a paper on Canadian coals by the writer in the Transactions of the North of England Institute of Mining Engineers, 1878.

The statistical tables of this report will show the production of coal and the various classes of labor employed in the collieries of Cape Breton County. It may be remarked that the collieries are well equipped, and worked in a systematic manner; and that, standing between the English and American coal fields, the operators have adopted from both the appliances and methods a varied experience has shown to be best adapted to the needs of Nova Scotian coal mining.

The enormous amount of available coal contained in this district may be estimated from the Geological Survey Report, which states that the seams now opened contain, in the areas leased for the purpose of working them, over 212,000,000 tons. This estimate does not include the coal in the seams which are unopened in the land areas in operation, nor the values of the seams in the leases which are at present awaiting a favorable opportunity for development, which items would swell the coal supply of this district to figures representing many years output greatly exceeding any yet obtained.

In addition to the seams already recognized in the Sydney coal field as at present worked, there are, in the vicinity of Sydney, and in the Mira and Salmon River districts, extensive tracts of the upper part of the millstone grit in which are met coal seams, some of superior quality, which although too small to be worked now in the presence of the large beds, must yield in the future an important supply of fuel.

OTHER CAPE BRETON COAL FIELDS.

On the River Inhabitants and at Port Hood, Chimney Corner, and Broad Cove, on the western shore of the Island, are small coal districts containing in all about 125 square miles, exclusive of the submarine extension of the seams found in them. At several points in these districts beds of coal of large size and of excellent quality have been opened, but as yet systematic coal mining operations in Cape Breton island have been confined to the Sydney district. It is claimed that many of these seams of coal are of very superior steam raising qualities, and it is anticipated that as the coal trade extends, the St. Lawrence markets will be largely supplied from this source.

Passing to Nova Scotia proper, coal seams are found at Pomquet and Antigonish, but the extent of productive ground is inconsiderable. Near New Glasgow, in Pictou County, there is a coal district, not of large extent, but noted for the great size of its coal beds, and for their excellent quality.

In 5,567 feet of strata, according to the surveys of the late Sir William Logan, there are 141 feet of coal contained in 16 beds, varying in thickness from 3 to 34 feet.

The coal is slightly less bituminous than that found in the Sydney district, and is especially adapted for steam raising. Several of the coals make an excellent coke which has been successfully used with raw coal in the blast furnaces of Londonderry in Colchester County. The coal of the Acadia seam is also in demand for domestic purposes.

The following analyses of the Albion main seam, thirty-four feet thick, and of other seams now worked, will show the quality of the coals:—

COMPOSITION.	Albion Main Seam.	Acadia Colliery.	Six Feet Vale Colliery.	Intercolonial Colliery.
Moisture.....	1.05	2.10	1.22	1.52
Vol: Comb: Matt: Fast Coking	27.42	32.78	25.87	31.87
Fixed Carbon "	62.18	57.57	62.70	57.78
Vol: Comb: Matt: Slow Coking	26.19	29.20	22.96	29.46
Fixed Carbon " ..	63.41	61.15	65.61	60.19
Ash	9.35	7.55	10.21	9.10
Sulphur	1.48	.50	trace.	1.62
Theo: Evaporative power	8.68	....	8.99	8.24

There are at several points in this district beds of oil shale, which may before long be found worth utilizing. Several beds of cannel coal have been found, one of which was for sometime worked on the property of the Acadia Coal Company, and yielded 126 gallons of crude oil to the ton.

There are four large and well-equipped collieries in this district. Their output is taken by the Londonderry Iron Works, local manufactories, and railways, and considerable shipments are made by rail and from Pictou Harbor to Quebec and Montreal.

The coal measures are interrupted at New Glasgow by lower strata, but in the opinion of Sir J. William Dawson, and other geologists, the coal measures extend many miles to the north and north-west under the covering of the upper division of the carboniferous system. Possibly at some points this covering may be thin enough to permit of the coal being reached.

Small seams of coal are known all along the shores of the Bay of Fundy, but have not yet been worked.

The Springhill coal field lies north of the Cobequid Mountains, in Cumberland County, at the western extremity of the problematical coal field referred to in connection with the Pictou district. The northern edge of this coal field has been traced from the Joggins shore of Cumberland Basin, about 18 miles, to the Styles mine, but its deflexion to the south to join the Springhill coal mines district has not been followed. On the Southern or Springhill side of the basin there is a large and important development of coal seams. The productive measures stretch for many miles in a westerly direction to the Cumberland Basin at Apple River, but have not yet been prospected. Several mines have been worked on the northern out-crop at the Joggins, Macan, &c., but the chief development has

been at Springhill by the Cumberland Railway and Coal Company, who have proved and extensively worked the following set of beds:—

	Ft.	In.	Ft.	In.
North Seam—Coal	13	..	..	..
Strata .....	..	..	105	..
Coal	5	..	..	..
Strata .....	..	..	130	..
Coal	2	4	..	..
Strata .....	..	..	185	..
Main Seam.....	11	..	..	..
Strata .....	..	..	80	..
South Seam.....	11	..	..	..
Strata .....	..	..	100	..
Seam	8	6	..	..
Strata .....	..	..	190	..
Seam	4	..	..	..
Strata .....	..	..	176	..
Seam	2	9	..	..
	57 7			

Their out-put is now at the rate of 350,000 tons per annum, and is largely used for steam purposes on Canadian railways, steam-boats, &c. The coal is also adapted for domestic purposes, and its coke is extensively used at the Londonderry Iron works.

The following analyses made by me some time ago will show the quality of the coal of this district:

CONTENTS.	North Seam.	Main Seam.	South Seam.
Moisture	1·625	·78	1·39
Vol. Combustible matter.....	28·672	31·32	31·22
Fixed Carbon.....	65·431	62·54	61·58
Ash	4·272	5·34	5·79
Sulphur	·783	1·38	·80
Evaporative power.....	8·99	....	8·46

The extent of country underlaid by the productive measures, is not yet clearly known, but has been estimated at 300 square miles. The district is intersected by the Intercolonial Railway; and a branch railway runs from the Springhill collieries to Parrsboro, on the Bay of Fundy, where extensive shipping docks are being constructed.

The history of Nova Scotian Coal Mining is a short one. Early writers of Colonial history refer frequently to the Cape Breton coals, which, outcropping on the beaches and in the sea cliffs, formed a prominent feature in the landscape, and were mined by the French and English garrisons of Acadia, and by a few American smugglers. This state of affairs continued until the early part of the present century, when, after a few attempts at systematic mining, the minerals of the

Province were granted to the Duke of York, who transferred them to the London jewellers, Messrs. Rundle & Bridge, who sold them to the General Mining Association of London in 1827. This company commenced extensive operations at Sydney, Pictou, and the Joggins in Cumberland Co., and continued them until 1857. At that time arrangements were made with the Government whereby the General Mining Association surrendered their claims, except to certain large tracts in the various coal districts, and the public were allowed to open mines under leases from the Government. This arrangement led to the opening out of quite a number of collieries, and the sales increased from 226,725 tons in 1858 to 395,637 tons in 1862. Nova Scotian coal was at this time admitted into the United States free of duty, and the sales to this quarter were about 450,000 tons in 1865 and 1866 out of a total of about 595,000 tons sold. In 1867 the U. S. imposed a duty of \$1.25 a ton which in 1872 was lowered to 75 cents a ton. But the sales to the United States continued to diminish, until in 1885 they were only 34,483 tons. In the meantime, the consumption in Nova Scotia and the adjoining Provinces had been steadily increasing, until in 1885 the sales of Nova Scotia coal were as follows:—

Provinces of Nova Scotia.....	444,652
New Brunswick.....	148,634
Newfoundland	74,322
Prince Edward Island.....	52,770
Quebec.....	493,917
West Indies	5,732
United States	34,483
<hr/>	
Total (long tons).....	1,254,510

PETROLEUM.

Indications of this valuable mineral have been observed at Cheverie, Hants Co., in Pictou Co., and at Lake Ainslie in Cape Breton, but the result of explorations made in the latter locality have not proved satisfactory.

THE GOLD FIELDS OF NOVA SCOTIA.

The auriferous district of Nova Scotia stretches in an irregular band along its southern shore. Its area is estimated at about 3,000 square miles. The gold mines are scattered irregularly through this band, the greater number being to the eastward of Halifax. The auriferous districts are found to contain numerous veins of quartz from one inch to six feet in thickness, running continuously in many cases for several miles. Nearly all these veins contain gold, but, as elsewhere, only a certain percentage are rich enough to work. They carry the gold in visible grains imbedded in the quartz, and in the various sulphides of copper, lead, iron, etc., invariably found in them. The width of the veins usually worked varies from four to twenty inches, but in some cases they are found to be highly auriferous when much wider.

These veins carry gold in amounts varying from a trace up to several ounces, and in common with auriferous veins of other countries, frequently present it in the form of "pay streaks" or rich zones in the vein. These pay streaks are of varied width and depth, and are frequently very rich. In the Sherbrooke district one of these rich deposits was followed to a depth of 600 feet. The quartz surrounding these richer portions of the veins varies in value from three to ten dollars a ton. Other veins again show a uniform yield, not exceeding one-half to three quarters of an ounce to the ton for long distances.

Among the more prominent districts at the present time may be mentioned the Salmon River Mines. Here work has been carried on for several years on a vein of quartz from three to six feet wide. Several shafts have been sunk to a depth of about 150 feet, and ore has been extracted from a portion of the vein about 900 feet long. The quartz is crushed in a stamp mill driven by water power, and placed about a quarter of a mile from the mine. There are eight batteries, each holding five stamps, weighing about 700 lbs. each complete. The average yield from the quartz has varied between 7 cwts. and one ounce to the ton. Owing to the size of the vein and the cheapness of the water power crushing, this ore could be profitably treated even if the value of the gold yield fell to five dollars, or say twenty shillings to the ton. Since the opening of the mine 33,253 tons of quartz have been crushed and yielded 18,047 oz. of gold. This mine can be taken as a sample of others now working in the Province, but it will be understood that the narrower the vein the richer its contents must prove, as the expense of mining increases rapidly with the greater amount of dead work. At Montagu, Rawdon, Oldham, Stormont, and Lake Catcha profitable mining has been carried on during the past year.

However tempting the prospects of the rich quartz veins may prove to the miner, the great future of gold mining in Nova Scotia, in my opinion, lies in the so-called "low grade" ores. In many of the districts are met wide belts of slate and quartzite, intersected by quartz veins, both the veins and the rocks being more or less auriferous. Experience in the Western States has shown that ore such as this, mined in large quantities and crushed and amalgamated in large mills of 75 to 100 stamps, pays well even when worth not more than \$5 a ton. Trials on a working scale have been made of such ores as they occur in this Province, and the field appears even more promising here than in any other gold mining country.

At Sherbrooke and Mount Uniacke large lots of this ore have been quarried and crushed in small mills, and the results have shown that such operations, if conducted on a large scale, with approved appliances, would pay well. The values of these crushings have averaged from 3 to 7 dwts. to the ton, and it can be safely asserted that nowhere can labor and the usual supplies of mining camps be procured more cheaply than in Nova Scotia.

ALLUVIAL GOLD.

In Nova Scotia, contrary to the history of most gold mining countries, alluvial work has played an insignificant part. It is generally believed that the causes, which have contributed to the present contour of the country, have swept all detritus away into the Atlantic. This is a mistake. Australian miners assert that bare rock surfaces are not more abundant in the district under consideration than in the gold districts of Australia. Small amounts of gold have been procured by alluvial work at Tangier, Waverley and Moose River, but no systematic attempts have been made to test the old river courses, or the still waters, etc., of the present drainage systems which run for the most part transversely to the strike of the veins. Many of the districts have a surface apparently rich enough to treat by sluicing and crushing, and several of the rivers are reported to give good tests.

At Gay's River, an ancient indurated sea beach or river bed lying on the auriferous measures, carries gold at the junction of the slates and conglomerate, and has been worked to some extent.

MINING.

The veins dip at all angles and are invariably opened by shafts sunk on the dip of the vein. This is not perhaps quite according to mining text-books, but experience shows that it is best adapted to the veins and to the encasing strata of this country. The stopes are carried from shaft to shaft, a distance of from 80 to 200 feet, by underhand work, powder or dynamite being used. The firmness of the rocks makes the mines usually very dry, and the expense of pumping is small whenever the surface is properly drained. The cost of mining, there being little dead work, varies according to the size of the vein and the hardness of the encasing rock, from 50 cents a ton in the open cast work to \$15 a ton in the narrow and tight bound veins. The quartz is crushed in stamp mills similar in general construction to those used in other parts of the world. The stamps weigh from 450 to 750 lbs. and fall at the rate of from 30 to 50 drops a minute. Mercury is fed into the mortar in which the stamps work, at frequent intervals, and the coarse gold is amalgamated and retained around the dies in the bottom of the mortar. The mills in common use in the Province crush to a fine powder about a ton of quartz to each stamp, in a days' work; when quartzite and slate are being treated more rapid progress is made. The pulverised ore is carried by water through fine screens and over copper plates amalgamated with mercury for the purpose of arresting the fine gold.

As already mentioned, the veins always carry sulphides, etc., of various metals, which include considerable amounts of gold. This gold is but partially arrested in the mill or on the plates, and usually passes into the refuse tailings. Assays show that these tailings when concentrated, are often rich enough to warrant attempts being made to save the gold, but hitherto no systematic attempts have been made in this direction.

All the auriferous ground in the Province is the property of the Government, and it issues leases for three terms of twenty years. The areas are laid off in rectangular form, each area being 150 by 250 feet, with the shorter sides parallel to the general run of the veins and the beds of the district. The fee paid for each area is two dollars. Similar areas can be taken under prospecting licenses for the space of six months, on payment of a small registration fee. Provision is made whereby the holder of any lease can require by arbitration or by grant from the Government, the ground needed for mining purposes. In return the lessee is required, under risk of forfeiture, to employ forty days labor on each of his leased areas, and to make periodic returns of this labor, and of all quartz sent to a mill.

Any person desiring to build a quartz crusher must procure a license therefor, and give bonds for the due discharge of his obligations, which are to keep an account of all quartz crushed, and to pay to the Government the royalty on all gold extracted. This royalty is at the rate of two per cent. on unsmelted gold valued at \$18 an ounce, and at the same rate on smelted gold valued at \$19 an ounce. By this arrangement the miner having delivered his quartz to the mill owner is free from any responsibility about the royalty, as the Government looks to the licensed mill owner for it.

The statistical tables at the end of the report show the yield of each district during the past year, and a summary of the returns since the compilation of statistics was commenced.

IRON ORES.

This, perhaps the most important of our mineral resources, has not as yet received attention at all commensurate with its value. The ores are of the most varied species and frequently very pure. They are generally accessible, near water or railway transport, and none of them at any great distance from coal. Beginning at the western end of the Province, titaniferous iron sand is met at St. Mary's Bay, and the trap rocks forming the south side of the Bay of Fundy yield abundant indications of specular and magnetite. At Clementsport and Nictaux are beds of red hematite and magnetite, formerly worked to a small extent in charcoal furnaces. From this point as far west as Windsor, specular, red hematite and bog ores are found, but little is known of their extent or value. Similar ores, sometimes highly manganiferous, are met between Windsor and Truro, at Goshen, Maitland, Brookfield, etc. The following analysis of limonite from the last named place is of a very pure ore:—

Water.....	11.36
Silicious matter.....	1.54
Phosphoric acid.....	trace.
Sulphuric acid	none.
Magnesia	trace.
Metallic iron.....	60.00

On the north side of the Bay of Fundy the limonite ores of Londonderry are well known. Their passage has been traced for fifty miles along the range of the Cobequid Hills, and they have been worked for many years at the Acadian Mines. Large amounts of a variety of spathic ore are mined and smelted with the limonite, and a good grade of pig made, part of which is converted into bar iron, etc. There are two large blast furnaces, with rolling mills, foundries, etc., and from 40,000 to 60,000 tons of ore are annually smelted. The following analysis will show the character of the iron ores, and of the iron made at this establishment:—

	Micaceous Hematite.	Limonite.
Per oxide of iron.....	96.93	82.65
Oxide of manganese.....		.25
Alumina .....	.33	.56
Lime ....	.04	.15
Magnesia.....	.11	.10
Phosphoric acid.....	.07	.38
Sulphuric acid .....	.03	.02
Water hygroscopic.....	.03	.31
Water combined.....	.79	10.51
Insoluble.....	1.26	4.79
Metallic iron	67.85	57.85

Spathose Ore (Sideroplesite.)

Insoluble silicious matter.....	.47
Calcic carbonate.....	.59
Ferrous "	69.20
Manganous "	1.37
Magnesian "	28.73
Ferrie oxide.....	.08

Analysis and tests by Riehle Bros.

Bar iron ductile and fine grained. Tensile strength. 60,000 lbs. per square inch, and elongation 33 per cent.

	No. 1 Pig.	Sieman's best Bar Iron.
Silicon.....	3.621	.280
Graphitic carbon	3.730	....
Combined carbon ....	.390	.096
Sulphur .....	.002	trace.
Phosphorus.....	.198	.035
Manganese	1.126	.041
Iron.....	90.933	99.548

Iron ores are known at Pugwash, Wallace, Joggins, Clark's Point, etc., north of the Cobequid Hills.

The Londonderry iron ore bearing ground passes north of Truro and extends into Pictou county, and may be said to terminate at Cape George in Antigonish county. On entering Pictou county near the line of the Intercolonial Railway, are met widespread indications

of specular ore, which at several points show veins of workable size. This specular ore ground extends to the head of the East River, a distance of about twenty miles, and carries ore veins, which, as proved on the Watson and Weaver properties, attain a thickness of fifteen feet. South of this band are deposits of limonite ores, which, however, are yet little known. In the vicinity of Springville, between the specular ore and the Pictou coal field, are large and valuable beds of limonite, sometimes highly manganiferous, and bedded red hematites attaining a thickness at some points of from 20 to 40 feet. Among the more prominent localities holding these ores may be mentioned Springville, Bridgeville, Blanchard, Little Blanchard, Webster's Mountain and Fall Brook. On Sutherland's River these ores approach the eastern end of the coal field, and the Watson ore bed at Fall Brook is about two miles from the Vale colliery, and is about fifteen feet in width. Still further east near the line of the New Glasgow and Cape Breton Railway are deposits of spathic iron ore and of clay ironstone. These ores extend for many miles, until the measures carrying them are cut off by the Gulf of St. Lawrence. An exposure of a bed of red hematite three feet thick at Arisaig marks the termination of this district, which is fifty miles long, and attains a maximum width of about six miles. Clay ironstone is met at several points in the Pictou coal field and between New Glasgow and Pictou.

The following analyses will show the character of the Pictou iron ores:—

	Limonite.	Clay Ironstone	Specular.	Red Hematite.
Water	7.702	2.132	.....	.....
Iron Peroxide.....	87.925	45.361	97.52	65.26
Alumina	trace.	16.962	.....	5.59
Silica	3.000	.780	3.20	25.68
Manganese Binoxide.....	trace.	.....	.....	.....
Lime	do.	trace.	.91	1.88
Magnesia .....	.500	1.655	.....	1.05
Sulphur	trace.	.612	.06	.....
Phosphorus	do.	trace.	trace.	.....
Metallic iron	65.54	35.00	68.33	43.4
Carbonic acid .....	.....	.....	.....	.....

The following analyses is of the spathic ore from Sutherland's River:—

Sesquioxide of iron.....	20.52
Carbonate of iron	57.40
Carbonate of manganese	8.29
Carbonate of lime.....	4.02
Carbonate of magnesia.....	5.66
Silica	2.38
Moisture	1.43
Sulphur	none.
Phosphorus	none.
Iron	42.07

It may be remarked that in Pictou county the conditions for making iron and steel cheaply are unsurpassed, as within a few miles are collected numerous iron ores, fluxes, and good furnace fuels, and there is railway and water communication with all parts of the Dominion.

In Cape Breton indications of valuable iron ores are frequently met, but hitherto there has been little inducement to test or develop them. Near East Bay a bed of red hematite ore from 4 to 13 feet wide has been traced several miles. The following analysis of it is from the records of the Geological Survey of Canada:—

Iron Peroxide	85.057
Silica	5.130
Sulphur .....	.075
Phosphoric acid.....	.032
Metallic iron.....	57.526

At Whycogomagh, on the Bras d'Or Lake, several beds of red hematite and magnetic iron ore have been followed for some distance, by trenches and natural exposures. Both these deposits are close to good shipping places.

Louisburg, Gabarus, Big Pond, Lake Ainslie, and St. Peter's, among other localities, may be mentioned as likely to contain valuable ores.

The conditions upon which iron ore lands are leased by the Government are similar to those regulating the coal properties, and will be referred to further on.

There are numerous localities yielding iron ores beside those I have briefly touched upon. Among these may be mentioned Salmon River Lakes, Boyleston, and Manchester, in Guysboro' county, where valuable deposits of specular ore have been superficially tested. At Stewiacke, Riversdale and Musquodoboit are ores of red hematite and limonite, while at numerous points over the Province are deposits of bog iron ore, often of good quality, and a valuable accessory to local smelting operations.

COPPER ORES.

Indications of copper ore are widespread throughout the Province, and although promising at several points, explorations have, in a few instances only, been pushed far enough to show workable deposits. The trap of Annapolis and Kings counties shows native copper, with carbonates, etc. Among the more promising localities may be mentioned Margaretsville, Digby, and St. Mary's Bay, Cape d'Or, etc. The carboniferous measures of Pictou, Cumberland, and Antigonish counties frequently show deposits of the vitreous sulphide and of carbonate of copper, and some of them may prove valuable. At several points in this district small lots of rich ores have been exported, but no attempts have been made at systematic work.

In the vicinity of College Lake, in Antigonish county, several valuable deposits of copper pyrites have been thoroughly tested. It is believed that large amounts of ore running from three to eight per cent. can be obtained here, but the depression in the copper trade has prevented development. In Cape Breton the precambrian felsites frequently show copper pyrites. These have been prospected with promising results at Gabarus and French Road, and at Coxheath near Sydney. At the last named locality a large amount of work has been done, showing the presence of immense masses of ore carrying from 3 to 8 per cent. of copper. Preparations are now being made to smelt these ores into a matte, a business for which the locality affords every facility in the way of fuel, fluxes, shipping ports, etc. Other localities are Cape North, Cheticamp, East Bay, Benacadie, etc.

LEAD ORE.

In this Province the only source of galena appears to be the carboniferous marine limestone series. At Gay's River, Shubenacadie, and Stewiacke it is frequently met in these rocks. At Smithfield, Upper Stewiacke, the limestones carry at several points large masses of galena, with copper and iron pyrites and calcite, and small amounts of silver are reported to be present in the galena. Preparations are being made to erect experimental smelting works at this point, as it is believed that an abundant supply of ore can be secured.

ANTIMONY.

This ore is known at several localities in the Province, but has hitherto been worked only at Rawdon, Hants county. Here a vein from 6 to 20 inches in width has been successfully worked during the past two years, and has yielded a very pure ore, all of which has been exported to England. The exports during the year 1884 were 463 tons, valued at \$17,865, and during the year 1885, 758 tons, valued at \$33,095. At present only the higher grade ore is shipped from this mine, and the accumulations of low grade ore await treatment. At the New Brunswick antimony mines this was largely smelted at a central furnace, and no doubt a similar plan could be advantageously adopted here.

MOLYBDENUM.

This mineral occurs at Gabarus in Cape Breton, and at Hammond's Plains and Musquodoboit in Halifax county. Small lots have been shipped from the first named locality, but no demand has yet risen to warrant attempts at its regular extraction.

NICKEL AND COBALT.

These elements occur in small quantities in the associated minerals of our auriferous veins, etc., and some of the iron sulphides occurring in the upper horizons of the lower cambrian hold them in notable amounts. Hitherto no attempt has been made to ascertain if they can be turned to any account.

MANGANESE.

There are numerous localities in the Province which have yielded rich deposits of these ores. At Tenny Cape, Hants Co., Onslow, Colchester Co., and Salmon River, Cape Breton Co., small shipments are annually made of very rich ore, containing from 89 to 98 per cent. of binocide, with mere traces of iron. The exports are principally to glass makers in the United States, and the ore brings from \$75 to \$100 a ton at the mines. Few shipments are made of the low grade ores, which are abundant, and a large trade could be done if a start were once made. Among other localities may be mentioned Pictou, Bridgeville, and Glengarry, Pictou Co., and Amherst, Cumberland Co.

Beds of wad, or bog manganese, are found at numerous points, but hitherto it has not proved profitable to export them.

GYPSUM.

This mineral occurs in the Province as soft or hydrated, and as hard or anhydrous gypsum. It is exposed in beds, varying in thickness from a few inches up to 200 feet, and is also found in fine grains and veins in the shales, marls, and limestones which are usually associated with it. In the Maritime Provinces it occurs in the carboniferous marine limestone formation, already referred to in connection with the manganese ores, and wherever the limestones appear it is usually at no great distance. It is so widely scattered through the northern and eastern parts of Nova Scotia that a detailed list of its exposures could not be given. It has been mined chiefly at Windsor, Cheverie, Walton, Maitland and Hantsport on the Bay of Fundy, and at Port Hood, Port Hawkesbury, Lennox Passage, Baddeck, and St. Ann's, in Cape Breton. Among the minerals found in the gypsum may be mentioned glauber salt, common salt, magnesium carbonate, sulphur, and several varieties of borates, similar to the Peruvian Ulexite and "Tiza." Should these borates be found in any amount in our gypsum beds they would undoubtedly prove of great value.

The Nova Scotian deposits of gypsum are on an unequalled scale, the beds being frequently traceable for miles by exposures presenting faces 50 feet in height. In Antigonish Co. it occurs on St. George's Bay as a crystalline cliff, 200 feet high, and similar exposures are met at

Plaster Cove, Mabou, and many other localities in Cape Breton. This scale of exposure, and frequent proximity to good shipping places, has materially aided the out-put of the mineral, and it can at many points be placed on board for 50 or 60 cents a ton.

The anhydrite is found imbedded in the soft gypsum, but is seldom exported. The exports of gypsum are almost entirely to the United States, where it is ground as a fertilizer, or boiled and ground for finishing houses, cornices, etc., according to its purity and color.

It is said to be a suitable dressing for tobacco and cotton lands, and large quantities are mined for this purpose in Virginia. The gypsum is used to a very limited extent in Nova Scotia for agricultural purposes; in fact in our best farming districts nature has disseminated this useful fertilizer very freely. A large mill in New Brunswick supplies the local market with the prepared article as required for architectural purposes. The annual exports, chiefly from Windsor and its vicinity, on the Bay of Fundy, vary from 80,000 to 140,000 tons, valued at about 95 cents a ton.

MINERAL PAINTS.

As might be anticipated in a country yielding iron and manganese ores, the different varieties of ochres and umbers are frequently met. Among the various localities yielding these mineral paints may be mentioned Londonderry, Onslow, Stewiacke, Maitland, Chester and Kentville. Small amounts are dried and ground for local use, but the trade is almost exclusively supplied from foreign sources.

BARYTES.

This mineral occurs at Five Islands, Bay of Fundy; River John, Pictou County, and at Stewiacke, Colchester County. At the latter place about 300 tons were mined last year, and was worked up at Halifax in the manufacture of paints, etc.

MINERAL WATERS.

At numerous localities through the Province mineral springs have been known for many years, and are used for various complaints. Few of these waters have been analysed, but they are worthy of careful examination, as the presence of mineral waters of undoubted excellence has frequently done much to attract visitors, and produce benefits important if not conspicuous.

In the gypsiferous districts brine springs are frequently met. Some of the springs in the early days of the settlements were utilised by those living in the vicinity, and considerable amounts of salt manufactured for home use. Now the imported salt has so lowered prices

that salt-making has ceased to be a provincial industry. The presence, however, of these brine springs is of importance in relation to the possibility of beds of salt being connected with the gypsum beds. Should examination prove this to be the case, a large and valuable industry would be revived. The same speculative interest attaches to the instances of sulphur occurring in the gypsum and gypsiferous marls.

BUILDING STONES.

The building stones of Nova Scotia are principally granite and sandstone. The various grades of the latter are procured principally from the upper divisions of the carboniferous system. Pictou, Colchester, and Cumberland Counties, therefore, are the principal producers. Many of the quarries in these counties have yielded stone for the construction of the public buildings of the Maritime Provinces, and of the New England cities. The granite of Halifax, Shelburne, and Ship Harbor is of excellent quality, and is largely used in foundations, steps, etc. Among other building material may be mentioned marble from Cape Breton, and limestone from Pictou and Antigonish Counties. The celebrated fortress and city of Louisburg was largely constructed of local crystalline diorite.

Slates of excellent quality occur in large quantities at Rawdon, Hants Co., and at several other localities, but at present they are in little demand, as roofs are covered with wooden singles.

Brick Clays of excellent quality abound in many places, and are worked to a small extent. The cheapness of wood has hitherto retarded the introduction of brick as a material for building purposes, except in the towns. However, brick buildings are gradually coming into more general favor, and a new market has been opened up in the manufacture of drain tiles, which are used in large quantities.

Among miscellaneous minerals may be mentioned plumbago, fire clay, refractory stone, soapstone, felspar, kaolin, infusorial earth, etc. These are known to exist in the Province at numerous points, and in quantities admitting of economic development, but at present the demand is not large enough to direct particular attention to them.

TENURE OF MINERAL LANDS.

The grant of lands to the early settlers in this Province contained no regular reservation of minerals, in some instances gold, silver, and precious stones only were reserved, in other cases the gold, silver, iron, copper, lead, etc., were retained for a source of revenue to the Crown. After the agreement with the General Mining Association, the Government passed an Act by which they retained in previous grants the gold, silver, coal, iron, copper, lead, tin and precious stones whenever reserved, and for the purposes of revenue made the above reservations in all future grants. This Act releases to the owner of the land all

gypsum, limestone, fireclay, barytes, manganese, antimony, etc., etc., and any of the above reservations, whenever they are not specified in the grant. There is no complete list published of all the grants, but information as to every grant can be obtained at the Crown Lands Office. The Department of Public Works and Mines is charged with the collection of revenue from the mines, the enforcement of the Mines Regulation Act, etc. Reference has been already made to the mode of granting gold licenses and leases, and the same remarks apply to silver and its ores. For all other minerals held by the Government for revenue purposes a somewhat similar system is adopted.

On application a tract not exceeding five square miles, called a License to Search, can be obtained for one year at a cost of \$20. Out of this the applicant may select, before the expiration of the term of one year, a tract of 640 acres, (one square mile,) for which he pays \$50. This is termed a right to work, and lasts for two years, and can be renewed for a further term of one year, on payment of \$25. During the existence of this right to work, the holder, if he commences *bona fide* mining operations, is entitled to a lease for twenty-one years, and renewals for three further terms of equal length. Provisions are made for securing the surface ground needed for mining, for proper returns, and for forfeiture on neglect to comply with the requirements of the lease, etc.

All the regulations connected with the leasing and working of the Provincial mines are framed with the view of affording all proper and necessary facilities to those desirous of entering into mining operations, and among not the least of these advantages may be mentioned the security of the title granted and registered by the Government.

The following are the rates of royalty paid by those holding under the Government :—

Each licensed mill owner shall pay or cause to be paid, in money, in weekly or other payments, as the Commissioner of Mines shall order, to the Commissioner or to the Deputy Commissioner for the district, a royalty of two per cent. on the gross amount of gold obtained by amalgamation or otherwise in the mill of such licensed mill owner, at the rate of nineteen dollars an ounce troy for smelted gold, and eighteen dollars an ounce troy for unsmelted gold, and of two per cent. on the silver, at the rate of one dollar per ounce troy.

Coal.—Seven cents and one half of a cent on every ton of two thousand two hundred and forty pounds of coal sold or removed from the mine, or used in the manufacture of coke, or other form of manufactured fuel.

The words “removed from the mine,” in the preceding section, shall not be held to apply to coal used for domestic purposes by the workmen employed in and about each mine; nor to coal used in mining operations in and about the mine from which such coal has been gotten; but coal so used shall not be liable to pay royalty.

Copper.—Four cents upon every unit, that is, upon every one per cent. of copper contained in each and every ton of two thousand three hundred and fifty-two pounds, of copper ore sold or smelted.

Lead.—Two cents upon every unit, that is, upon every one per cent. of lead contained in each and every ton of two thousand two hundred and forty pounds, of lead ore sold or smelted.

Iron.—Five cents on every ton of two thousand two hundred and forty pounds of ore sold or smelted.

Tin and Precious Stones.—Five per cent. on their values.

COAL TRADE.

The total sales for the year 1885 amounted to 1,254,510 tons, made up of 778,378 tons of round, and 247,676 tons of slack coal, and 228,456 tons of run of mine coal, as compared with 1,261,650 tons sold during the year 1884, comprising 945,518 tons of round and 316,132 tons of slack coal.

The following are the most noticeable points in the coal trade:—

The home sales were 444,652 tons compared with 493,050 tons in 1884, and 471,327 tons in 1883.

The Province of Quebec took 493,917 tons, against 396,782 tons in 1884, and 410,605 tons in 1883.

The sales to New Brunswick were 148,634 tons, compared with 158,420 tons in 1884.

Newfoundland took 74,322 tons, against 86,216 tons in 1884.

The sales to Prince Edward Island were 52,770 tons against 50,399 tons during the preceding year.

The West Indian sales have again decreased, being 5,732 tons against 9,595 tons during 1884, and 31,860 tons in 1883.

The sales to the United States were made up of 10,497 tons of round and 23,986 tons of slack coal, against 64,515 tons in 1884. These sales to the United States are the smallest recorded since the year 1850.

CUMBERLAND COUNTY.

The total sales of this county amounted to 340,535 tons against 258,405 tons in 1884, and 222,347 tons in 1883.

The home sales were 83,953 tons, against 59,502 tons during the preceding year.

The sales to New Brunswick were 92,872 tons against 93,724 tons during 1884.

The Province of Quebec took 163,303 tons, as compared with 104,243 tons in the year 1884.

COLLIERIES.

Chignecto.—During the past year a few men were employed at this mine, and the air ways, levels, etc., were kept in repair. The output was 6,084 tons.

Joggins.—Work has been continued in the new slope, and the levels are now over one thousand feet to the eastward. The seam presents the following section :—

	ft.	in.
Top coal	3	6
Fire clay	1	6
Bottom coal	2	0
	<hr/>	<hr/>
	7	0

A new furnace 7 feet by 5 feet above the bars has been put up, with a column of 100 feet. The output of the mine was 17,664 tons against 25,034 tons in 1884.

Minudie.—During the shipping season work was continued as usual at this mine, and the output was 7,702 tons as compared with 10,023 tons during 1884.

At the Milner Mine a little work was done, and Mr. S. E. Freeman, during the fall, opened out the slopes in the old Lawson Mine, and extracted some coal.

Springhill.—The operations of the Cumberland Railway and Coal Company have been pushed with their usual enterprise. The sales for the year are the largest for any single company, being 335,055 tons, against 232,481 tons during the preceding year. The development of the South slope has been continued, and further exploratory work carried on in a recently acquired property lying to the south east of it. The underground operations have been continued as usual.

The Company are now preparing to extend their railway from its present terminus at Parrsboro Village to the mouth of the river, and to construct at that point a dock for coal shipments on a large scale. This arrangement, when completed, will provide an outlet which will probably assure the control of the Bay of Fundy and the St. John coal trade to this district.

The Saltspings Colliery engine house was burned down during the summer, and the company have not resumed work. Mr. W. Patrick continued opening out his mine at Maccan, which yields a coal of very superior quality, and is now prepared to ship steadily.

PICTOU COUNTY.

The total sales were 396,000 tons against 464,181 tons in 1884.

The home sales were 209,428 tons, against 262,780 tons during the preceding year.

The Province of Quebec took 145,363 tons, compared with 139,934 tons in 1884.

The sales to Newfoundland, Prince Edward Island, and New Brunswick remain about the same as in 1884.

COLLIERIES.

Acadia.—Work has been continued with customary regularity. The new pump has been found to work well. As it is the heaviest single lift in America, the following notes will be of interest:—

The mine is opened by a slope 2400 feet long, vertical depth 1000 feet. The pump is a Knowles of the duplex compound condensing type, with high and low pressure steam cylinders, 12 and 22 inches in diameter, 24 inch stroke with four $5\frac{1}{2}$ inch plungers working against a head of 435 lbs. per square inch. The column is six inches in diameter, of wrought iron, the air chamber is 30 by 15 inches, the steam pipe, 2600 feet long, and four inches in diameter takes the steam from Babcock boilers on the surface, at a pressure of 105 pounds. The pipe is protected with an infusorial earth jacket, the material being taken from a local deposit. After a year's service this pump has given no trouble, and no joints have leaked. There is no suction on the pump, the lower valves being below the level of the pump. The pump usually makes 10 double strokes a minute, but could run 25 strokes, equal to 100 feet piston speed a minute. A small hydraulic ram will raise the water from the lower level to the pump.

Albion.—There is little new to be noticed at these works during 1885. The McGregor pit was closed during the summer, as the coal trade was dull. The slack from the Third Seam was used at the Coke ovens and found to answer well. During the past season new ropes were put in the Foord Pit Shaft, and the level of the water was lowered by tanks. By utilising the plant at this point, the expense of new pumping gear in the Third Seam winnings is obviated. The output was 129,195 tons against 201,557 tons during the preceding year.

Intercolonial.—The main slope is now 2650 feet long, the underground engine hauling 950 feet, and the surface engine hauling the remainder of the distance. During the summer a tendency to "creep" which showed itself on the 1700 feet level was checked by cutting out a few pillars. No work was done in No. 4 Slope, and in the new pit. The output was 109,139 tons compared with 120,656 tons in 1884.

Montreal and New Glasgow.—During the year 1885 a little work was done on this area by Mr. Muir, and the coal extracted was favorably received in the New Glasgow market.

Vale Colliery.—Operations in the McBean Seam were interrupted for a short time by a serious accident, attended with much loss of life. From examinations made by me, I was led to believe that the ignition and explosion of a comparatively small amount of gas was extended by the combustion of coal dust. More particulars will be given further on in the report. The results of the investigations made by me and Mr. Madden, Deputy Inspector, are given by him in his report.

The Six Feet Seam is now opened and in full working order. A very fine pair of winding engines has been put up, with the necessary

heapstead, screens, branch railway, etc., and will prove an important factor in the future coal trade of the district. The output was 76,125 tons against 73,529 tons in 1884.

CAPE BRETON COUNTY.

The total sales during the past year from Cape Breton County were 517,975 tons, compared with 539,064 tons in 1884.

The home sales were 151,371 tons, compared with 179,768 tons in 1884.

New Brunswick took 28,498 tons against 39,463 tons in 1884.

The Newfoundland sales were 69,833 tons, compared with 83,143 tons during the preceding year.

The sales to Prince Edward Island were 13,613 tons against 19,056 tons in 1884.

The sales to Quebec show 215,254 tons, compared with 152,605 tons in 1884.

The West India trade showed only 5,618 tons against 21,872 tons during the preceding year.

The trade with the United States was only 33,788 tons, compared with 62,565 tons in 1884.

COLLIERIES.

Sydney.—Operations at this colliery were interrupted last spring by a serious fire, which was only extinguished by tapping the metal tubing of the shaft, and drowning out the district in which the fire was situated. In the fall an opening was made into the Francklyn submarine lease, and operations will be continued as far to the rise as the cover will permit. The output was 124,274 tons, against 149,378 tons in 1884.

Victoria.—This mine may now be considered in full working order, the output for last year being 47,614 tons. Surveys have been made for the extension of the railway about $2\frac{1}{2}$ miles to the Barasois, where an opening is being made on the Barasois seam. Should the road ultimately be extended to Lingan, and the artificial harbor at the latter place be abandoned, the company will be in a position to meet any demands for coal at their pier at the South Bar.

Lingan.—Work here presents no new features of interest. The output was 21,761 tons, compared with 23,404 tons in 1884.

Reserve.—Work has been continued briskly at this mine during the past season. The dip slope has reached the Emery Seam, and preparations are being made to win out pit room. The engines, shops, etc., having been concentrated at the Reserve Mine, the company will

be able readily to carry out their plan of working all the areas from this point. The output was 83,276 tons, against 87,216 tons in 1884.

International.—Operations at this mine present no new features. The main dip is now 2000 feet in length, and the levels are being steadily advanced to the east and west. A new shop for locomotive and other repairs, and a new office, have been erected. The output was 67,959 tons, compared with 87,485 tons in 1884.

Bridgeport.—Mr. Henry Mitchell has completed fitting up his colliery, and is now ready for steady work. During the past season he raised 13,178 tons of coal.

Little Glace Bay.—No change has been made in the operations of the mine. The output was 39,400 tons, compared with 36,138 tons in 1885.

Caledonia.—The extraction of coal has been continued in the pillars. A dip plane has been driven down a short distance west of the pit bottom, and the coal is raised by an underground engine. The output was 58,859 tons against 69,461 tons in 1884.

Ontario.—A little work was done in the upper level of this mine, and a few cargoes shipped.

Block House.—The work of extracting pillars was continued during the summer, and was facilitated by the dryness of the season. The output was 11,075 tons against 22,668 tons in 1884.

Gowrie.—A pair of dip slants are being pushed from a point east of the new shaft, and have opened up a fine tract of coal. The question of utilising slack coal is being tested by the Messrs. Archibald. They have erected a Yeadon patent Briquette machine. Roughly speaking, the operation consists in thoroughly mixing the slack with pitch and compressing it into bricks under a heavy pressure. Mr. Charles Archibald writes :—

“The Briquette Plant is capable of making fifty-four tons of briquettes in ten hours. The weight of each brick is about $11\frac{1}{2}$ lbs., and we allow 195 bricks to the gross ton (2240 lbs.) The briquettes are made from the fine coal and eight to nine per cent. of coal tar pitch. This fuel is particularly adapted for steam purposes, and is most suitable for locomotives. It is easy on fire bars and leaves fine ashes. We expect to get a market in the West Indies and South America as well as a market in the Dominion.”

The output of the mine was 74,414 tons against 89,384 tons in 1884.

GOLD.

The returns show that 157,421 days' labor were performed, and that 28,890 tons of quartz were extracted and crushed, yielding 22,203 oz., 12 dwts. of gold, during the year.

I am pleased to be able to state that the anticipations of a good year's work, ventured in my last report, have been verified, the yield having exceeded that of the preceding year by 6,124 ounces, and being the largest recorded since the year 1867, at which period the yield was:—

1865.....	25,454 ounces.
1866.....	25,204 “
1867.....	27,314 “

Encouraging as this may appear, it is still evident that when a comparatively small production, such as this is considered, the failure of one or two productive mines will seriously affect the year's total. Since the year 1862 the total annual production has varied between 7,275 and 27,314 ounces, an amount totally out of proportion to the known richness of many districts, and the extent of auriferous ground. I would strongly urge upon our gold miners the importance of testing and developing all possible supplies of low grade ore. Several districts are known to contain large bodies of such ore, and in this country, with its abundant water power, cheap supplies and labor, and its favoring climate, gold mining must, in my opinion, seek its future expansion in this branch of the business.

DISTRICTS.

CARIBOU.—The returns for 1885 show that 2,239 tons were crushed, yielding 1,335 ounces, as compared with 1,559 tons yielding 966 ounces in 1884. There was some work done by Mr. Touquoy, and by Mr. Wright on the Heatherington property. The Lake lead, opened during the preceding season, was worked successfully.

At **MOOSE RIVER** a good deal of work was done by tributors on the little North lead on the Moose River gold mining property. Mr. Touquoy prospected to the west of this property, and found a new eight inch lead, good for about one ounce to the ton.

DARR'S HILL.—The Dufferin Gold Mining Company have concluded a highly satisfactory year's work. The main shaft is now about 150 feet deep, and toward the east the vein has been found to increase in width and richness. There were 10,880 tons of quartz crushed, yielding 4,924 ounces of gold, the total yield being to the

end of 1885, 18,047 ounces from 33,253 tons of quartz. Another equally promising lead has been found here.

FIFTEEN MILE STREAM.—The operations of the Hall, Anderson Company were continued on the lodes referred to in previous reports, until midsummer, when work was stopped. Mr. Hudson continued working, and steady returns have been made from his property, and it is to be hoped that the regularity and persistence of his operations will again bring this district into the prominent position it merits.

GAY'S RIVER.—A little work was done here at one or two points.

MONTAGU.—During the year 1885 the New Albion Gold Mining Company continued to work the DeWolf and Twin leads. The returns show that 2,809 tons yielded 4,001 ounces, placing this district second in the rank of the gold producing localities of the Province.

The deepest shaft, No. 1, on the DeWolf lead, reached a depth of 150 feet, and stopes were carried along the vein for a distance of about 700 feet. On the Twin lead stopes were driven about 500 feet, the main shaft being 150 feet deep. During September a very rich paystreak was struck, which yielded 1,369 ounces from 337 tons of quartz. As is not unusual, the quartz surrounding this streak proved during the remainder of the year, comparatively low grade. Operations in this lead have been continued, and the Twin lead is proving richer. A new lead called the Iron lead is being opened up.

Some prospecting was done by Mr. Oakes and others to the south of the New Albion area.

OLDHAM.—Mr. McDonnell and others continued their shaft, referred to in my last report, to a depth of 200 feet. In the fall operations were discontinued, pending the erection of steam power for more efficient pumping and hoisting purposes.

Mr. Hardman continued working to the westward of Mr. McDonnell, and has opened up an unusually rich lead, promising large amounts of mill ore. He has perfected his arrangements for pumping and hoisting at his main shaft, by power generated by a motor driven by the water power at his crusher, distant about one half a mile. Some quartz was taken out by the Messrs. Donaldson and others, but the principal operations were confined to the points referred to. The returns show that 1,170 tons of quartz yielded 2,360 ounces of gold.

RENFREW.—Mr. Hayward continued to work the Empress Mine and is now getting into excellent ground. Crushing was at a stand-still during great part of the season, owing to an unusually dry spell. Mr. D. A. McDonald and Mr. Rae also did some work. The returns show a yield of 639 ounces from 641 tons of quartz.

SHERBROOKE.—Operations in this district present few points of interest. The depression which characterised the season of 1884 has continued, the returns for the past year showing 1,238 ounces from 2,426 tons of quartz. Although several veins on the north dip have

been worked to a considerable depth, the belt hitherto operated is a narrow one, and it is to be hoped that fortunate discoveries may increase the width of productive ground. In view of the depth to which the northerly dipping veins have been followed, it hardly appears possible that the gold in the south dipping veins can be exhausted at the shallow depth to which they have been worked.

In the early part of the season Mr. Williams worked in the New York and Sherbrooke areas, and Mr. Cameron opened a small lead north of the former workings on the Wellington. The big pump was started to take out enough water to permit a test of a lead lying close to the Dewar. Work was also done on the Caledonia and Alexandria properties by Messrs. Brown, McNab and others. Mr. G. May did some work on the Meridian, in the old seven feet workings. On the Pactolus some work was done in the untried ground to the west of the open cut.

At Cochran Hill a little work was done by Mr. Cumming, and in the fall Mr. R. P. Fraser repaired the mill at the Crow's Nest, and resumed work, and also tested several promising new leads.

STORMONT.—The Gallagher Gold Mining Company continued mining on the leads referred to in previous reports, but on a smaller scale. A lead was opened at the mouth of Country Harbor, and preparations made for systematic mining.

TANGIER.—This district has shown little improvement last year. In the spring some work was done by the Essex Company, and work was continued on Strawberry Hill by Mr. Townshend. Mr. J. Irvine continued working at Mooseland.

In the spring a little work was done on the Pittsburg area, and in the fall the discovery of a large and rich lead was reported from Clattenburg's Brook, West Tangier.

UNIACKE.—The returns show that 576 ounces were extracted from 2010 tons of quartz, an average of 5.7 dwts. Operations were continued by Mr. Davidson, Mr. Prince, and others, but no new work of interest was performed.

WAVERLEY.—In this district Mr. Huff continued prospecting, and in the fall opened a lead on American Hill, which promised well. Some work was done on the veins near the western mill.

UNPROCLAIMED, ETC.—At Wine Harbor, Mr. Colchester worked on a lead yielding about 15 dwts. to the ton.

YARMOUTH.—The Kemptville mines have been successfully operated during the past year, and the district has proved the most promising of any yet opened to the west of Halifax. The returns show 624 ounces from 133 tons of quartz.

Some work was also done at Pubnico, a trial lot yielding 64 ounces from 5 tons of quartz.

At Lake Catcha work was continued by the Oxford Company on the leads already opened, and leads in areas 227 and 228 were worked. Other parties are making preparations for work, and it is anticipated that the year 1886 will show an improvement in the returns from this district.

At Millipsigate, Messrs. Hall and Owen, and others worked on leases 311, 282, and 284.

At Whiteburn (Caledonia), Queen's County, the Messrs. McGuire have opened up a lead on their property to a depth of about 20 feet, and have taken out some unusually rich quartz yielding at the rate of 17 ounces to the ton. They have made arrangements to put up a steam mill, and to begin regular work in the spring. Messrs. Hall, Owen, Barss, and Messrs. Cole, Telfer and Annand, prospected the ground north of McGuire's, and proved about ten gold bearing leads from 4 to 12 inches in width. Trial crushings of quartz from some of the larger veins showed 3 ounces to the ton. These leads will be worked in the spring. Prospecting was also carried on at Brookfield.

RAWDON.—Mr. McNaughton has continued working the Sims lead, which has been opened over a length of about 900 feet. The returns show 1,173 tons crushed for a yield of 2,759 ounces. Some prospecting was done in the vicinity of this mine, and there appears to be a large extent of auriferous ground in this district.

IRON MINING.

During the year 1885, the operations at the Mines of the Steel Company of Canada were continued as usual. Large quantities of the white "Spathose" ore were extracted from the west mines. Promising bodies of ore were opened up to the east of the Folly Mountain Mines.

At Bridgeville, on the East River of Pictou, further explorations were made on the Saddler area, by Mr. J. H. Bartlett and Mr. R. P. Fraser, of Pictou. Mr. William Grant also mined about 80 tons of limonite, part of which was shipped to the Londonderry furnaces.

GYPSUM.

Operations were continued as usual in the quarries in the Windsor district, but the exported tonnage was less than in the preceding year. The Messrs. McCurdy of Baddeck, shipped some plaster from St. Ann's Harbor, and some work was done by Mr. C. A. DeWolf, at the Lennox Passage quarries.

ANTIMONY.

The operations at the Rawdon Antimony Mine have been steadily continued during the year. A large and well timbered shaft has been sunk near the road, clear of the vein; and through it all future operations of pumping and winding will be carried on. The returns show that discoveries of Antimony ore are reported from Kentville, and from the Melrose district, Guysboro' County.

COPPER.

During the past season Mr. M. F. Egar did some work on a promising deposit of copper pyrites near Pinkietown, Antigonish County. Dr. Johnstone and Mr. J. McNeil proved some rich ore in the same locality.

At Coxheath, near Sydney, in Cape Breton County, the Coxheath Copper Company have had a line of railway six miles in length surveyed from the mine to Lime Point, on Sydney Harbor. Land has been secured and arrangements made for erecting a large establishment for treating their own and foreign ores, for conversion into matte. It is stated that contracts extending over terms of years, have been made, which guarantee abundance of ore in addition to the large amounts which recent exploratory work has shown in their own mine. Towards the close of the year more powerful pumping and winding gear were erected, and the compressed air drill plant enlarged to the dimensions originally contemplated, and the sinking of the shaft and extension of the preliminary levels vigorously pushed. It is confidently believed by the Directory of the Company that the essentials for the successful prosecution of a large copper reducing business exist at this point. Certainly the conditions of cheap fuel, limestone, iron ore, water carriage, etc., etc., cannot be surpassed. Trial runs made under the superintendence of Dr. Peters, the well known copper expert, with Coxheath ore, Reserve coke, and local fluxes of Sydney limestone and iron ore, gave the greatest satisfaction, yielding copper matte of excellent quality, with an insignificant loss of metal. The establishment of this undertaking would open a market for the many deposits of rich copper ores known in Antigonish, Pictou, Colchester and Cumberland Counties, which have not yet been worked.

MANGANESE.

Mr. J. W. Stephens continued working at Tenny Cape and Walton. The Messrs. Churchill are reported to have found good ore at Hantsport. Messrs. Thompson and Foster tested a bed of manganese ore near Kentville, which is stated to be suitable for making ferromanganese. On the Salmon River, near the Valley Station, work was continued by Messrs. Carter, Archibald and others, and about 60 tons of ore mined. The ore occurs as a gravel lying on sandstones in the vicinity of carboniferous limestones, and as irregular veins cutting the measures. The Hon. E. T. Moseley continued working at the Morrison mine at Salmon River, Cape Breton.

DEPUTY INSPECTORS' REPORTS.

DISTRICT OF PICTOU, COLCHESTER AND CUMBERLAND.

WESTVILLE, PICTOU CO., N. S.,

December 31st, 1885.

E. GILPIN, Esq.,

Inspector of Mines:

DEAR SIR,—I have much pleasure in forwarding you a condensed statement for the past year of my work as Deputy Inspector of Mines for the District of Pictou, Colchester and Cumberland.

VALE COLLIERY.

I was at this mine very frequently during the year, in all 22 times. On February 10th, a serious explosion took place in the McBean Seam, by which thirteen men lost their lives and five were seriously injured. I was in Cumberland County at the time, and arrived at scene of disaster on the 12th, and remained for some length of time investigating the cause of the accident.

On April 6th I went down the McBean Seam to the point where the men had been working at the time of the explosion, and examined a hole at that point which was supposed to have been fired on the night of the explosion, and which some of the officials consider caused the explosion. The cause of the explosion at the Vale Colliery is a matter of dispute amongst experts, but the most reasonable solution appears to be as follows:—On the west side of the slope at 1300 feet level were two check doors, which, when shut, sent the air circulating down the slope, but if opened the air would rush to the upcast, as an exhaust fan is situated on that side, and thus the lower part of mine would be cut off from the air communication, which, if allowed for any length of time, would undoubtedly accumulate gas; from appearances, I would judge this to have transpired, and gas to have been generated in the manner supposed. Gas then having been driven down by the restored action of the air, was forced upon Foley's lamp, who was working in a head about 100 feet from sinking-face. He was burned almost to a crisp, whilst two-thirds of the men below him had scarcely a singed hair. Whilst sinking they drive leads east and west from back slopes, at intervals of about 60 feet, at right angles to slopes, which are cut again at the face coming up the hill with shoots. Heads driven up the hill off the air current, any distance, and left standing, will fill with gas; this has been an occurrence before the explosion and since, which would lead me to believe that the air current must

have in some way been tampered with, and the restored action resulted as I have stated. In support of this view, I would say that the timbers in the slopes from the head in which Foley worked "downward," that is toward the sinking face, gave unmistakable evidence that the explosion came from above, whilst the timber above this head gave like evidence that the explosion came from below, until it reached the 1800 feet level, which is some 400 feet above the head, then it expanded east and west, destroying the check-doors on the levels, and showing slight signs of the explosion for a distance of 200 or 300 feet in the levels inside the doors, which were from 70 to 100 feet off the slope. The stoppings between the main slope and back slopes from this level up to 1300 feet level were blown down. Strange to say, the first check door at 1300 feet level on west side was found standing open, whilst the inside door was destroyed. At this point there were men employed taking timber from the slope to some point inside of the doors. The explosion had gone in this level a distance of not more than 200 or 300 feet. The stoppings from 1300 feet level to mouth of slope were blown down and timber and debris were strewn in a confused way all through the slope.

The force of the explosion seems to have been spread over the area I have mentioned, viz., on the main slope and back slopes, and extending east and west from main slope a distance of from 200 to 300 feet, over which area the timber was in many cases blown down, and falls of roof took place, while the working faces on the east and west side of pit were free from any appearance of explosion, and in as good order after as before.

After the mine resumed work and the water was extracted, a hole was discovered at the working face of the sinking. The evidence brought to show that this hole was fired before the explosion, did not appear conclusive.

On November 26th, I experimented with dynamite in this mine, and believe that under favorable circumstances it might be used with advantage for some coal mining purposes.

HALIFAX COAL COMPANY.

Slopes Nos. 1 & 2.—During the year I visited those slopes 12 times. On my inspections I found that the management kept the mine in good order, and in compliance with the law. Gas during the entire year was to some extent given off in No. 2 slope.

McGregor Pit.—This mine was idle from and including June 3rd. I made several official visits, on which occasions, after travelling the working faces and airways, I found they were in satisfactory condition. In December I travelled the workings to the rise and found the airways, etc., in excellent condition.

ACADIA COAL COMPANY.

Acadia Colliery.—I made official visits to this mine 12 times during the year. Work was carried on to every appearance in a satisfactory and systematic manner. They have sunk the new lift a

distance of some 600 feet, making the total depth of this slope on the angle 3100 feet, or a vertical depth of 1307 feet. A pump of the Knowles pattern has been added to this mining plant, which is capable of performing all the duty required.

INTERCOLONIAL COAL COMPANY.

Nos. 1 & 2 Slopes were visited by me twelve times. During the summer a weight came on the pillars of the 1700 feet level which caused a creep, and in September, on my visit, I learned that the pillars, which were being extracted from three lifts, viz., on the 1000 feet, 1300 feet, and 1700 feet leads, were successfully extracted from the two first named, but owing to the creep on 1700 feet level, as large a percentage of coal could not be got from it as the others. In August the management ceased pumping at the Scott pit, which is sunk to the second seam. During the year gas was reported in pillar workings, upon which the use of powder was discontinued. I have found the air, as regards quantity, all that could be wished for, and the air passages kept clear.

Alexander Grant and John Muir have done a considerable amount of work on a seam of coal at Coal Brook, a short distance east of New Glasgow. They have erected a small winding engine and force pump. The coal in slope presents a troubled appearance, but in the bords driven eastwardly it is of a more regular form.

CUMBERLAND COUNTY, SPRING HILL MINES.

I visited these mines ten times during the year. On my visit in March there was some gas reported on the west side of west slope, the law was complied with and shot-firers appointed. In November the airways of west slope, which had become partially unsafe, were being retimbered, and in December I ascertained it was all in good condition. The South slope at this date was down a distance of 830 feet and sinking operations still continued. The coal has as good an appearance at this point as it had at the start. There is another seam of coal 11 feet thick, which presents a good appearance, underlying this seam. A small shaft is sunk on it, and considerable prospecting has been done with good results.

CHIGNECTO.

I visited this mine ten times during the year. This mine is in good order, and the air all that could be desired, but for some cause the mine has not been in very active operation during the year. But it is in order to make a large output of coal whenever it is requisite so to do.

JOGGINS.

I visited this mine ten times during the year, namely:—January 12, February 11, April 13, May 18, June 23, July 18, August 11, October 13, November 17, December . This mine has been idle for a good part of the year. I travelled working faces and airways, and found all in good order.

MILNER MINE.

John Hurley left this mine about the middle of the year, and Alexander Dewar had charge until about October. From 3 to 8 men were employed in it for the most part of the year. I have made ten official visitations to the works and found volume of air, etc., satisfactory. Since October Mr. Ripley has taken charge of this mine.

MINUDIE.

I paid ten visits to this mine during the past year. This mine has been doing a little for the most part of the year. The air is good. They still continue the long-wall system with fair results.

SCOTIA.

I visited this mine ten times during the year. On June 24th, at date of a visit, I found that fire had started on west side of new slope; in July it was to appearances extinguished, but I am strongly of opinion that it is there still. In August they had shut down the old slope and started to open up a new slope, and they completed this work in September, and since that date they have been taking out coal.

S. E. Freeman in August commenced operations on the old Lawson mine, and has driven down the old slope sixty feet, and has since had a few men to work getting out coal.

SALTSPRINGS MINING CO.

This mine was also regularly visited by me. In January they had everything in preparation for sinking, and in March were down 137 feet, in April levels were driven off 140 feet. During my subsequent visits the mine was idle, and unfortunately the engine house was burned down in September, and from that time operations ceased.

WILLIAM PATRICK & CO.

In this mine in the summer Mr. Patrick started 2 or 3 men to work, and had been gradually increasing the number as the mine was opened up, until they had 9 or 10 men to work at the end of the year. The water is extracted from the works by means of a syphon. The seam is about 2 feet thick and of excellent quality.

The foregoing is a condensed statement of my work on the past year. I have likewise appended tables shewing the volume of air in each mine, the number of accidents, etc., etc.

Accidents during the year 1885, in the Pictou, Cumberland and Colchester Mines.

No	Date.	Name of Mine.	Person.	Occupation.	Remarks.
1	Feby. 10	Vale Colliery	John Campbell	Overman .	Killed by explosion.
2	"	" "	Neil McKinnon	Driver....	
3	"	" "	P. McBeth....	Stableman	
4	"	" "	H. Cameron ..	Pumpman.	
5	"	" "	D. Kennedy ..	Loader....	
6	"	" "	J. McLean....	Bottomer .	
7	"	" "	J. McEachern	do.	
8	"	" "	P. Foley.....	Miner	
9	"	" "	T. Ryan.....	Bottomer .	
10	"	" "	J. W. Fraser..	Miner	
11	"	" "	J. Grant.....	do.	
12	"	" "	D. McNeill....	do.	
13	"	" "	Joe Haggart..	do.	
14	"	" "	A. McDonald..	.....	Injured by explosion.
15	"	" "	J. Robertson..	.....
16	"	" "	J. Guthro ..	.....
17	"	" "	H. Lamont....	.....
18	"	" "	R. Love .....	.....
19	" 29	Acadia	Charles Reid...	Miner	Hands burned with gas.
20	April	Saltsprings..	Mike Murphy ..	do.	Collar bone broken.
21	" 28	Acadia	— McDonald..	Driver....	Jammed with boxes.
22	May 16	Drummond .	Nor'an McKenzie	Cageman .	Jammed between prop and cage.
23	" 27	"	— Leadbeater	Driver....	Leg broke.
24	" 27	Spring Hill.	Angus McLeod..	Miner	Foot smashed.
25	Aug. 28	"	Don'd McDonald	do.	{ Legs broken; died in a few days after accident.
26	" 28	Spring Hill.	John Scully	do.	Killed; run over by cage.
27	Sept. 24	Vale	John Guthro....	do.	Burned with gas.
28	" 24	"	Charles Guthro..	do.	" "
29	" 25	"	John O. Hanley.	do.	" "
30	Oct. 8	Albion	James Ferguson.	Trapper...	{ Leg broke; empty rake on slope run over him.
31	Nov....	Patrick Mine	John McGilvray.	Miner	Leg broke riding on boxes.
32	Dec....	Spring. Hill.	— Wilson	do.	{ Seriously burned by an explosion of powder.
33	Dec....	" "	— Hoslem	do.	
34	Nov....	" "	George Wallace..	do.	{ Arm broke by a piece of coal from the working face.

Table shewing the Quantities of Air in cubic feet per minute, as measured by me in the Cumberland and Pictou Collieries, during the year 1885.

COMPANY.	MINE.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Halifax Coal Co., Stellarton..	McGregor Pit	59,691	59,010	67,449	72,708	76,298	76,790	Idle.	Idle.	Idle.	Idle.	Idle.	Idle.
	Slope No. 1.....	19,000	19,500	34,500	27,750	24,750	27,600	21,000	24,000	23,250	23,312	21,750	26,850
	Slope No. 2.....	21,000	21,250	27,720	28,000	25,920	23,040	21,600	22,320	23,760	24,060	18,000	24,480
	Slope	67,000	92,500	90,000	96,900	96,000	95,000	89,400	91,000	88,220	99,050	97,900	95,000
Intercolonial Coal Co., Westville..	Slope	60,000	61,200	71,000	63,500	54,120	65,000	54,100	62,000	61,500	52,800	64,700	64,850
Acadia Coal Co., Stellarton....	McBean Seam.....	Idle.	.....	64,000	66,000	72,000	71,125	64,440	34,580	37,750	38,100	70,000	67,700
Vale Coal Company	Six Feet Seam	18,000	.....	17,700	15,000	11,330	12,090	12,000	19,000	25,000	29,400	32,200	32,000
Spring Hill Coal Company	West Slope	17,550	.....	31,500	34,800	15,600	15,000	14,900	17,000	21,150	25,570	24,800	29,000
	East Slope.....	35,200	.....	22,000	14,700	33,000	32,000	32,600	31,000	30,000	31,408	32,520	31,600
	North Slope	Idle.	.....	35,000	30,000	31,650	27,300	24,500	25,600	41,000	51,600	50,800	51,200
	Slope—Chiegnecto.	14,500	.....	17,000	15,120	17,100	17,600	16,150	13,000	12,700	12,300	13,800	17,200
Chiegnecto	Minudie.....	Idle.	4,000	.....	4,800	5,000	5,400	4,000	3,600	.....	5,000	5,750	6,200
Minudie	Slope	Idle.	Idle.	Idle.	18,240	19,700	21,200	2,200	13,960	.....	12,200	13,300	Idle.
Joggins	Slope	3,200	Idle.	Idle.	4,000	4,500	5,000	4,050	7,000	.....	5,050	4,000	4,700
Boston Mining Company	Slope	4,300	Idle.	4,330	3,700	Idle.	.....	.....	5,000	.....	7,000	6,500	7,100
Scotia	Slope	Idle.	Idle.	Idle.	Idle.	Idle.	Idle.	Idle.	Idle.	Idle.	1,200	2,000	3,000
Lawson	Slope	Idle.	.....	3,700	4,800	Idle.	5,120	Idle.	Idle.	Idle.	Idle.	Idle.	Idle.
Saltsprings	Slope	Idle.	.....	.....	1,800	1,875	1,940	1,960	2,000	2,000	2,520	5,600	6,000
New Glasgow Coal Company....	Slope .....	.....	.....	.....	Idle.	Idle.	.....	.....	.....	.....	2,125	2,600	2,700
Patrick Mine	Slope .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

I remain, yours truly,

W. MADDEN, JR.,

Deputy Inspector of Mines.

CAPE BRETON.

BRIDGEPORT, *January 13th, 1886.*

E. GILPIN; ESQ.,

Inspector of Mines:

DEAR SIR,—I beg leave to hand you the following report as Deputy Inspector of Mines, of my work in the Island of Cape Breton for the year ending December 31st, 1885 :

SYDNEY MINES.

I visited this mine fourteen times during the past year. On January 20th fire was discovered in some of the old workings on the north side of the pit towards the dip. It was thought at first that it could be extinguished in two or three days, but it spread rapidly through the workings in spite of every effort made to put it out. It was then deemed necessary to flood that district. About the 16th of March work was resumed, as is usual, on the south side of the pit, and also on the north side towards the rise. A number of men were engaged splitting and taking coal from the pillars. In the meantime the water in the burnt district was lowered considerably, so as to admit of the miners going to work again in the boards on the north side.

VICTORIA MINES.

This mine has worked very steady the past year, the levels have been extended, and counter levels driven parallel to them for the purpose of ventilation and drainage. A new landing has been made at the bottom of the east slope, which gives more room. The ventilation in this mine is much improved, the fan is capable of giving a much greater quantity than shown on the table, if required.

BARASOIS.

At this mine a new parallel slope is being driven on the west side of the one driven last year. As they are extended towards the dip, the coal seems to improve in quality very much. There has been a large engine brought to this mine for the purpose of pumping and hoisting coal, etc. It is now in course of erection.

LINGAN MINES.

In this mine I cannot notice any considerable change. The work was carried on in the usual way, except a new return air course through a portion of the lower workings. The water discharged from the colliery is pumped by three home manufactured pumps in three lifts, one delivering to the other. No. 1 discharging to a level that leads to the sea shore.

OLD BRIDGEPORT.

At this mine a new hoisting engine of 50 horse power has been put up; also bank and pulley frames, screens, cages, and slides. In the pit the headways have been extended 468 feet towards the rise. The manager says that it is his intention this winter to drive one of these to the surface for a travelling road, and the other to a shaft to be sunk for a furnace. If this is done this colliery can be easily ventilated next season. There is no water pumped from this mine, as it runs to the sea shore through a water level. The workings are not yet driven below tide level.

INTERNATIONAL MINE.

At this mine the work under ground has been carried on as usual. The column pipes were replaced by new ones wherever required, and about 800 feet of piping was inserted. There is not as much water pumped from this mine as from most of the others, owing to a water level driven from the sea shore, which drains off the surface water between that and the crop of the coal. Also, there is no broken surface to the dip of this level.

RESERVE MINE.

At this mine the levels at the south side of the French slope have been extended, and an air shaft sunk on one of them; also, slants have been driven towards the dip. From North slants at six chains levels were broken off, and driven about two chains. From the south slants at ten chains bords have been broken off, but no levels driven yet. The drift has been driven from the Reserve to the Emery seam, and it is intended to sink an air shaft this winter on it.

CALEDONIA MINE.

At this mine a pair of slants have been driven on the west side of the shaft 500 feet to the dip. At 300 feet levels have been turned off right and left, and driven, and bords broken off, making two working sections in that district. The manager says that it is his intention to have those slants further driven this winter, to gain another lift. The pumps at this colliery are in two lifts or sets in the shaft, one pumping to the other.

LITTLE GLACE BAY MINES.

In the underground workings at this mine there has been no change made last year. The coal raised from the mine has been taken from bords already broken off. On the surface there has been a fine smokestack and six boiler seats built, and one new and two old boilers placed in. In a few days the other will be put in.

ONTARIO MINE.

At this mine the upper level has been timbered and cleared out to the face, and also a road laid in. The bords on the high side of this level have also been timbered, and crosscuts opened towards the furnace

for ventilation. The coal mined for the past season was taken out of this section.

BLOCK HOUSE MINE.

At this mine work has been rather dull. The coal mined for the past season was partly taken from pillars to the dip.

GOWRIE MINE.

In this mine there has been a pair of slants driven at the east side of the pit bottom fifteen chains and fifty links. Also the hanging roof along the main road has been down to make more room, and for the purpose of greater safety. A new engine, manufactured by the Ledgewood Manufacturing Company of New York, is being placed on the surface to haul the coal from the deeps. The pumps that are in the shaft are in two lifts ; they are the ordinary perpendicular lifting pumps, the same as at Caledonia, Little Glace Bay, and Sydney Mines.

I beg to enclose you in tabular form number of cubic feet of air measured by me on my visits, number of tons of water discharged, number of tons of coal raised, etc. Also, table of accidents and their causes during 1885.

In conclusion, I would like to draw your attention to one particular thing, that is, the careless manner in which miners load horizontal holes bored in rock. It often happens that the holes are three-cornered, and during loading some of the powder remains in the lower groove, and is very often ignited by the stemmer. Such was the case with John Peck at Sydney Mines last year, and two others injured at the International in 1884.

Report of Accidents in Cape Breton Mines during 1885.

Date of Accident.	Name of Mines.	Name.	Occupation.	Remarks.
April 18	Reserve	Michael McMullin.....	Miner	Fall of coal from face.
May 28	Sydney Mines ..	John Peck.....	Miner	Explosion of gunpowder, blasting rock.
June 25	Sydney Mines ..	Thomas Mahar.....	Labourer....	Run over by full trip on engine plane.
"	Sydney Mines ..	Neil McInnis.....	Labourer....	" " "
August 5....	Little Glace Bay	Hugh Campbell.....	Miner	Collar bone broken by fall of coal from face.
September 3.	International....	Duncan Curry	Miner	Leg fractured by fall of coal from face.

Report of No. of cubic feet of Air passing through Mines in Cape Breton for 1885.

NAME OF MINE.	Jan.	Feb.	March.	April.	May.	June.	July.	August.	Sept.	Oct.	Nov.	Dec.
Sydney Mines	10,000	10,000	25,230	31,325	36,000	40,000	.....	34,000	47,260	46,350	55,000	43,986
Victoria	19,320	19,000	18,000	19,200	15,580	20,000	28,850	28,000	31,370	.....	36,540	40,000
Barrasois .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	5,000
Lingan	12,000	21,000	21,500	25,000	20,000	19,600	.....	18,000	21,500	.....	20,270	21,000
Bridgeport .....	.....	.....	3,000	3,400	.....	4,150	1,600	1,500	3,000	.....	5,000	5,000
International .....	.....	.....	.....	28,800	31,000	27,500	.....	28,500	26,000	.....	28,830	20,000
Reserve	20,000	.....	.....	16,300	26,000	27,400	30,000	22,000	24,300	.....	31,394	28,000
Caledonia	1,500	.....	4,612	27,500	28,000	32,200	34,640	36,000	37,734	30,523	29,000	7,500
Little Glace Bay .....	.....	.....	13,000	6,000	6,500	7,000	.....	9,230	14,000	9,000	9,750	10,000
Ontario .....	.....	.....	3,500	5,000	3,000	2,500	4,000	4,000	8,700	6,600	.....	5,500
Block House .....	.....	.....	.....	17,500	18,000	.....	.....	10,000	.....	.....	.....	18,000
Gowrie .....	.....	15,000	.....	22,500	20,000	19,500	16,500	20,000	24,130	20,000	25,300	.....

I remain, yours truly,

PATRICK NEVILLE,

Deputy Inspector of Mines.

Average weight of Water pumped during year ending Dec. 31st, 1885, compared with the weight of Coal raised during the same period.

NOVA SCOTIA.

COMPANY.	MINE.	APPLIANCES.	Gallons of Water per 24 hours.	Tons of Water raised year 1885.	Tons of Coal raised year 1885.
Intercolonial Coal Company.	Nos. 1 and 2 slopes.	1 No. 2 Cameron Pump.	35,000	63,875	109,139
		1 Nos. 3 and 4 Cameron Pump..			
		1 No. 3 do. ..			
		1 Knowles Independent Condenser			
Acadia Coal Company.	One Slope	Knowles Pump	86,400	157,680	98,150
	McBean seam, one slope. ..	1 Knowles Steam Pump	25,200	45,990	76,125
Vale Coal Company	Six feet seam, one slope....	1 Cameron Pump	10,800	19,710	
		1 do. do.			
		1 Blake do.			
		Water hoisted with Boxes			
Halifax Coal Company	Douglas seam, slopes 1 and 2	No. 8 Cameron Pump	15,600	28,470	129,195
	McGregor seam, shaft.....	Hoisted with Iron Tanks	19,104	34,864	
	Foord Pit.....	2 Blake Pumps	1,056,000	(Ran only a por- tion of year.)	
	East Slope.	2 Cameron do.....	307,627	561,419	
Cumberland Railway & Coal Co., Spring Hill Mines. ..	West Slope.....	2 Allison do.....			
Montreal and New Glasgow	.....	.....	.....	.....	20,210
Joggins Mines	One Slope.	1 Burrel-Johnston Pump	23,142	42,234	17,664
Milner .....	.....	.....	.....	.....	200
Chignecto.....	Slope	Cameron Pump.	14,400	26,280	6,084
Boston Mining Co.....	Slope	Water level of this mine worked along out-crop of seam	Unknown	.....	.....
Scotia	Slope	Same as preceding	Unknown	.....	1,318
Minudie	Slope	No. 4 Cameron Pump.	17,666	32,240	7,702
Lawson Mine, per S. E. Freeman	Slope	Hoisted by Boxes ..	7,200	3,312*	115
W. Patrick & Co	Slope	Syphon	9,600	17,520	485

* This is for October, November, December, 1885.

CAPE BRETON.

COLLIERIES.	No. of Pumps.	Name and style of Pump.	Average gallons discharged per day.	Tons of Water raised during 1885.	Tons of Coal raised during 1885.
Sydney Mines.....	2	Double Acting.....	172,620	261,278	125,033
Victoria	2	Lifting Pump.....	139,863	227,901	47,614
Lingan.....	2	Double Acting.....	142,380	232,003	21,761
International	3	Built to order	80,124	131,056	67,959
Reserve	2	Cameron	7,275	117,885	
.....	2	Cameron, No. 6	115,984	334,000	83,276
.....		" " 5	124,500	170,785	58,859
Caledonia	2	Lifting Pumps	86,400	334,678	39,400
Little Glace Bay.....	1	No. 6 Cameron.....	205,384		
.....	2	Lifting Pumps.....	648,720		
Block House	3	Knowles	139,984	268,457	11,075
.....		Built to order.....	139,984		
.....		" "	328,264	535,252	74,414
Gowrie	1	Knowles' Special			130
Barasois	2	Built to order			13,178
Old Bridgeport		Sinking.....			7,779
Ontario		Natural drainage			
		Totals		3,646,889	1,352,205

LIST OF MINERAL LEASES (OTHER THAN GOLD).

No.	Lessee.	District.	Area, Sq. Miles.
COPPER.			
ANTIGONISH COUNTY.			
2	Ross, McKay, and others.....	.....	1
COLCHESTER COUNTY.			
	Moir, Wm. C., et al.....	Tatamagouche	10½
CAPE BRETON COUNTY.			
105	Burchell, J. E.....	.....	1
106	Burchell, G. L., and others.....	.....	1
95	Coxheath Mining Co.....	.....	1
104	McKenzie, H. R., et al.....	.....	1
94	McKenzie & McKim .....	.....	1
HALIFAX COUNTY.			
1	McClure, Chas. F.....	Gay's River	1
IRON.			
PICTOU COUNTY.			
44	Hudson, James	East River.....	1
43	Hudson, James	"	1
Total area under lease.....			19½ square miles.

LIST OF MINERAL LEASES (OTHER THAN GOLD).—Continued.

No.	Lessee.	District.	Area, Sq. Miles.
	IRON.—(CONTINUED).		
	CAPE BRETON COUNTY.		
86	Brookman, S., et al.....	N. Side East Bay	1
91	Brookman, S. L.....	East Bay	1
93	Brookman, S., et al.....	" "	1
102	C. L. Ingraham.....	" "	1
103	A. McKenzie, et al.....	" "	1
92	Matheson, D., et al.....	" "	1
84	Protheroe, Pryse.....	Cow Bay	1
16	INVERNESS COUNTY. Inverness C. I. & R. Co.....	Whycocomagh	1
Total area under lease.....			27½ square miles.

LIST OF COAL LEASES.

No.	Lessee.	Colliery.	Area Sq. Miles.	Working.	Agent and <i>Manager</i> .	Postal Address.
1	McKinnon, et al....	ANTIGONISH CO.	3			
13, 14, 15	Black, C. H. M.....	CUMBERLAND CO.	3			
21	Bligh, James, et al.....	.....	1			
47	Boston, C. M. Co.....	.....	1		John Moffat ..	River Herbert
25	Campbell, Alex., et al....	.....	1			
"	" " " " " " " " " "	.....	2			
32, 34	" " " " " " " " " "	.....	4			
35, 48, 49, 50	Campbell, John.....	.....	8			
31, 33, 37, 38, 40, 41, 45, 46	Campbell, W.....	.....	1			
54	Cumberland C. M. Co....	Chignecto	4	Working.	<i>Jas. Baird</i>	Maccan.
12	Cumberland R'y & Coal Co.	Springhill	9	Working.	R. G. Leckie.. } W. Hall	Springhill.
6, 7, 8, 44, 52, 55	Domville, James .....	.....	3		E. N. Sharp..	St. John, N.B.
17	Joggins C. M. Association ..	Joggins	2		<i>P. McNaughton</i>	Joggins.
20, 42	Joggins C. M. Co.....	Cumberland	2			
18, 19	Macfarlane, A. ....	.....	2			
5	Livesey, John .....	.....	2			
51, 53	Lawson C. M. Co.....	Maccan	1			
1, 2, 3, 4	Milner, Christopher .....	.....	2			
	New York & Acadia Co..	Scotia.....	4	Working.		Maccan.

16	Seaman, Gilbert	.....	1	Working.	<i>M. Dunlop</i>	River Herbert
24	Shannon, S. L.	.....	2			
36, 39	Shannon, S. L. (in trust) et al	.....	2			
22, 23, 28, 29, 30	Styles Mining Co. (Ltd.)	.....	5		J. S. Hickman..	Amherst.
9	Victoria Coal Mining Co.	.....	2			
26, 27	Wright, John V.	.....	3			
			65			
PICTOU CO.						
1	Acadia Coal Co.	.....	1	Working.	{ H. S. Poole...	Stellarton.
3	"	.....	1	"	{ <i>J. Maxwell</i> ..	Westville.
42	"	.....	4		{ J. B. Moore...	New Glasgow.
23	Allan, Sir Hugh, K't.	.....	3	Working.	{ <i>T. Turnbull</i> ..	Vale Colliery.
10	Gray, B. G., et al.	.....	1			
11	Halliburton, R. G., et al.	.....	1			
	Halifax Co., (Ltd.)	.....	4	Working.	{ S. Cunard & Co	Halifax.
13, 14	Intercolonial Coal Co.	.....	2		{ <i>J. Rutherford</i>	Stellarton.
12	"	.....	1	Working.	Robert Simpson	Westville.
6	Kirby, Lewis R.	.....	1			
15, 30, 31	Merigomish Co.	.....	3			
25	Nova Scotia Co.	.....	4		M. H. Angell..	Westville.
24	Richey, M. H.	.....	1			
			27			

LIST OF COAL LEASES.—(CONTINUED).

No.	Lessee.	Colliery.	Area Sq. Miles.	Working.	Agent and Manager.	Postal Address.
3	Archibald, Blowers	CAPE BRETON CO.				
2	Archibald, Thomas D.	Gowrie	1	Working.	{ Archibald & Co. Chas. Archibald.	North Sydney Cow Bay.
5, 28	Blockhouse Mining Co.	"	1			
29	" (sea area) ..	Blockhouse	2	Working.	R. Belloni	Cow Bay.
72	Brooknan, Samuel	"	1			
76, 77	" S., et al.	"	1			
15	Caledonia, C. & R. Co.	Caledonia	2			
31	" (sea area) ..	"	1	Working.	David McKeen...	Glace Bay.
30	Campbell, Alex.	"	1			
8, 9	Halifax Coal & Iron Co. ..	Ontario	1½	Working.	T. D. Archibald... Jno. Sutherland..	North Sydney Pt. Caledonia.
87	Cossit, Geo. G.	"	1			
	General Mining Association	Bridgeport	2			
27	" " " (sea area) ..	Sydney	18	Working.	{ Rich. H. Brown. Cunard & Morrow	Sydney Mines Halifax.
38, 39	Low Point, Barasois, and ..	"	4		{ H. Mitchell.... Donald Lynk....	Bridgeport. Low Point.
10, 21	Lingan Mining Co., (Ltd.)	Lingan	13	Working.		
4, 12, 16	Gibson, John, et al.	"	10			
	Glace Bay Mining Co.	"	2			
75	Henry, W. A.	Glace Bay	3	Working.	{ E. P. Archibald. Chas. Rigby....	Halifax. Lt. Glace Bay.
22	Ingraham, J. L.	"	1			
		Halfway	1			

	International Coal Co., Ltd.	International.....	Working.	P. Johnstone.....	Bridgeport.
6, 13, 18, 19	Jennings, Edward.....	.....	4		
71	LeCras & McInnes .....	.....	1		
47	Merchants' Bank of Canada.	Gardener	1		
66	Moore & Moseley.....	.....	2		
74	McDonald, W. B.....	.....	1 $\frac{1}{4}$		
101	McLeod, Hugh .....	.....	1		
52, 53	Paint, Henry N., and others	.....	3		
88, 89, 90	Protheroe, Pryse .....	.....	2		
83, 85	Reid, Thos. S. (<i>sea area</i>)..	.....	2		
73, 82	Ross, H. E., et al.....	.....	3		
40, 41, 42	Ross, W. J., et al (<i>sea area</i>)	.....	1		
79	South Head Coal Co.....	South Head	1		
43	Sword, Wm. (<i>sea area</i>)..	.....	3		
32	Sydney & Louisburg Coal &	Schooner Pond..			
23, 25, 70	R. R. Co., Ltd.....	Reserve	10	{ F. C. Kimber... Sydney.	
14, 24	" " "	Lorway		{ W. Routledge.. Reserve Mines	
49	" " "	Emery			
64, 65, 68	" " "	Collins	10		
69	Sydney C. M. Co. (<i>sea areas</i>)	.....	1		
54 to 63	Toronto Coal Co.....	.....	1		
46	Weatherbe & Kirby .....	.....	1		
67	Weatherbe, R. L. (<i>sea area</i>)	.....	5		
78	Low Point, Barasois and	.....		
96, 97, 98, 99, 100	Lingan Mining Co., Ltd.. " (<i>sea areas</i>)	.....	5		
		.....	2	Working. D. Lynk.....	Low Point.
			128 $\frac{3}{4}$		

LIST OF COAL LEASES.—(CONTINUED.)

No.	Lessee.	Colliery.	Area Sq. Miles.	Working.	Agent and Manager.	Postal Address.
		INVERNESS CO.				
5	Aylmer, John Evans Freke.	Cape Mabou	2			
8	Evans, Thomas.....	Chimney Corner.	1		T. Evans.....	Chimney Cor.
9	Evans, Thomas (<i>sea area</i>)	.....	1			
7, 12	Inverness C. I. & R. C.....	.....	2			
13	McGregor, J. D.....	Port Hood.....	3			
4	Richey, M. H., et al.....	.....	1			
11	Ross, W. J.....	Broad Cove	1		Alex. Wright....	Moncton.
6	Ross, H. E., et al (<i>sea area</i>)	.....	1			
14, 15	Smyth, Peter.....	.....	2			
10	Trenaine, E. D., (<i>sea area</i>)	.....	1			
17	McDonald, Hugh .....	.....	1			
			<u>16</u>			
		RICHMOND CO.				
2	Victoria Oil and Mining Co.	Little River	1			
			<u>1</u>			
		VICTORIA CO.				
2	Kenny, T. E.....	New Campbellton	3			
3, 4, 5	Ross, William	Black Rock	5			
			<u>8</u>			
Total area under lease			245 $\frac{3}{4}$	square miles.		

TABLE A.—COAL TRADE BY COUNTIES.

	CUMBERLAND.		PICTOU.		CAPE BRETON.		OTHER COUNTIES.		TOTAL.	
	Raised.	Sold.	Raised.	Sold.	Raised.	Sold.	Raised.	Sold.	Raised.	Sold.
1st Quarter	57,102	49,787	92,726	69,168	29,979	6,396	.....	.....	179,807	125,351
2nd Quarter	98,512	91,238	110,780	97,575	162,705	120,700	.....	.....	371,997	309,513
3rd Quarter	101,220	95,605	130,860	137,132	237,100	278,050	.....	.....	469,180	510,787
4th Quarter	112,089	103,905	98,453	92,125	118,694	112,829	.....	.....	329,236	308,859
Total	368,923	340,535	432,819	396,000	548,478	517,975	.....	.....	1,350,220	1,254,510
1884	279,946	258,405	511,193	464,181	598,156	539,064	.....	.....	1,389,295	1,261,650
1883	247,861	222,347	505,626	461,809	668,293	612,614	773	753	1,422,553	1,297,523
1882	243,284	218,349	480,953	446,137	641,151	585,568	423	125	1,365,811	1,250,179

TABLE B.—COAL TRADE BY COUNTIES.

	CUMBERLAND.			PICTOU.			CAPE BRETON.			OTHER COUNTIES.			TOTALS.			Grand Total.
	Round.	Slack.	Run of Mine.	Round.	Slack.	Run of Mine.	Round.	Slack.	Run of Mine.	Round.	Slack.	Run of Mine.	Round.	Slack.	Run of Mine.	
Nova Scotia																
Land Sales	24,431	37,704	19,507	98,093	65,658	2131	2305	5892	87	....	....	....	124,829	109,254	21,725	255,808
Sea borne	1571	740	.....	33,380	10,066	....	129,914	12,919	254	....	....	....	164,865	23,725	254	188,844
Nova Scotia, total..	26,002	38,444	19,507	131,473	75,724	2131	132,219	18,811	341	....	....	....	289,694	132,979	21,979	444,652
New Brunswick	37,616	22,362	32,892	25,573	1693	....	28,163	335	....	....	....	....	91,352	24,390	32,892	148,634
Newfoundland .....	.....	.....	.....	4468	21	....	69,123	710	....	....	....	....	73,591	731	.....	74,322
P. E. Island .....	.....	.....	.....	13,316	25,841	....	10,988	2625	....	....	....	....	24,304	28,466	.....	52,770
Quebec	17,360	20,095	125,845	114,697	666	....	151,166	16,348	47,740	....	....	....	283,223	37,109	173,585	493,917
West Indies .....	.....	.....	.....	99	15	....	5618	....	....	....	....	....	5717	15	.....	5732
United States	412	.....	.....	283	.....	....	9802	23,986	....	....	....	....	10,497	23,986	.....	34,483
Other Countries .....	.....	.....	.....	.....	.....	....	....	....	....	....	....	....	.....	.....	.....	.....
Total	81,390	80,901	178,244	289,909	103,960	2131	407,079	62,815	48,081	....	....	....	778,378	247,676	228,456	1,254,510
1884	155,999	102,406	...	330,309	133,872	....	459,210	79,845	....	....	....	....	945,518	316,132	.....	1,261,650
1883	152,453	69,894	.....	319,859	141,950	....	543,419	69,195	.....	687	66	....	1,016,418	281,105	.....	1,297,523
1882	151,281	67,068	.....	329,350	116,787	....	522,325	63,245	.....	125	....	....	1,003,079	247,100	.....	1,250,179

COAL.—SALES.

MARKETS.	1st Quarter.	2nd Quarter.	3rd Quarter	4th Quarter.	Year 1885.	Year 1884.
N. Scotia.						
Land Sales.	69,824	61,461	54,578	69,945	255,808	266,475
Sea borne..	6,720	43,706	91,998	46,420	188,844	226,575
N. Scotia—Tl	76,544	105,167	146,576	116,365	444,652	493,050
N. Brunswick	17,574	35,911	45,182	49,967	148,634	158,420
Newfoundl'd..	84	12,253	36,337	25,648	74,322	86,216
P. E. Island..	.....	13,747	28,118	10,905	52,770	50,399
Quebec	30,738	135,446	233,764	93,969	493,917	396,782
West Indies..	245	675	774	4,038	5,732	9,595
United States	166	6,314	20,036	7,967	34,483	64,515
Other Conntries....	.....	.....	.....	.....	.....	2,673
Total....	125,351	309,513	510,787	308,859	1,254,510	1,261,650
1884..	138,303	307,915	486,601	328,821	1,261,650	1,297,523
1883..	141,994	325,153	498,913	331,463	1,297,523	1,250,179

COAL.—GENERAL STATEMENT.

1885.	Produce.	Sales.	Colliery Consumption.
1st Quarter	179,807	125,351	30,862
2nd Quarter	371,997	309,513	28,477
3rd Quarter	469,180	510,787	31,912
4th Quarter	331,221	308,859	36,373
Total.....	1,352,205	1,254,510	127,624
1884	1,389,295	1,261,650	116,769
1883	1,422,553	1,297,523	111,949
1882	1,365,811	1,250,179	111,381

COAL PRODUCE OF NOVA SCOTIA DURING THE YEAR ENDED DECEMBER 31ST, 1885.

COLLIERIES.	SEAMS.	PRODUCE.	SALES.				COLLIERY CONSUMPTION.		
			Round.	Slack.	Run of Mine.	Total.	Per cent.	Engines.	Unknown.	Per cent.
CUMBERLAND Co.									
Chignecto	North	6,084	3,359	1,409	.....	4,768	1,262	179	23
Joggins	Joggins	17,664	11,473	3,157	.....	14,630	2,492	327	15
Milner .....	.....	200	51	.....	.....	51	.....	.....	.....
Minudie .....	.....	7,702	6,493	627	.....	7,120	500	172	8
Patrick .....	.....	485	383	102	.....	485	.....	.....	.....
Springhill	North, Main and South.	335,055	58,171	75,375	178,244	311,790	16,057	3,360	5
Salt Springs .....	.....	400	75	153	.....	228	160	4	40
Scotia	North	1,318	1,270	78	.....	1,348	.....	.....	.....
Lawson .....	.....	115	.....	.....	.....	115	.....	.....	.....
PICOU Co.									
Acadia	Acadia	98,150	58,791	31,637	.....	90,428	5,237	2,083	7
Albion	Third and McGregor ..	129,195	74,395	37,535	2,131	114,061	11,847	4,196	12
Intercolonial	Acadia	109,139	75,435	22,442	.....	97,887	6,412	2,690	8
New Glasgow * .....	.....	200	.....	.....	.....	.....	.....	.....	.....
Vale	McBean and Six Feet ..	96,135	76,288	12,346	.....	93,634	12,464	1,542	14
CAPE BRETON Co.									
Barasois	Lingan	130	10	.....	.....	10	.....	.....	.....
Bridgeport	Phelan	13,178	11,953	630	.....	12,583	63	33	7
Blockhouse	Blockhouse	11,075	7,316	.....	.....	7,316	2,000	710	25
Caledonia	Phelan	58,859	39,024	9,527	.....	48,551	1,123	1,136	3
Franklyn	Sydney	759	136	623	.....	759	.....	.....	.....
Glace Bay	Harbor	39,400	31,351	4,218	5,420	40,989	2,927	1,295	10
Gowrie	Gowrie	74,414	57,718	13,024	6,838	77,580	2,040	2,130	5
International	Harbor	(?)67,959	45,634	6,028	35,823	87,485	1,915	1,338	4
Lingan	Lingan	21,761	17,233	1,634	.....	18,867	2,381	1,319	17
Ontario	Phelan	7,779	7,293	152	.....	7,445	92	236	4
Reserve	Harbor	83,276	59,644	12,903	.....	72,547	4,408	3,516	9
Sydney	Sydney	124,274	95,727	8,190	.....	103,917	13,639	6,694	16
Victoria	Victoria	47,614	34,040	5,886	.....	39,926	5,719	928	13
			778,378	247,676	228,456	1,254,510	93,736	33,888	.....
			1,352,203						.....

* Further returns show 431 tons raised and 295 tons sold last quarter, 1885.

COLLIERY CONSTRUCTION ACCOUNT.—1885.

COLLIERIES.	Shafes.	Slopes.	Adits.	Machinery.	Colliery Buildings.	Dwellings.	Surface Works.	Railways.	Wharves.	Prospecting.	Total.
CUMBERLAND COUNTY.											
Chignecto	\$275 00				\$750 00						\$ 1025 00
Joggins											
Lawrence											578 00
Milner	\$200 00		\$198 00			\$83 00	\$ 80 00	\$100 00	\$85 00	\$574 00	2310 00
Minudie	411 00		42 00	\$ 481 00			634 00				
Salt Springs											1245 00
Wm. Patrick	40 00	660 00	150 00	120 00			275 00				19993 00
Springhill				9000 00	3334 00		4845 00	360 00		2454 00	
PICOU COUNTY.											
Acadia				3263 00							3263 00
Albion											2385 00
Intercolonial				1670 00	715 00						6000 00
Vale				3000 00		3000 00					2025 00
New Glasgow		500 00	500 00	800 00	75 00		150 00				
CAPE BRETON.											
Barrasois		899 00		1143 00							2042 00
Bridgeport	90 00		275 00	754 00	230 00	800 00	770 00	156 00			3075 00
Blockhouse											
Caledonia		1035 00	1141 00	1116 00				405 00	644 00		4341 00
Glace Bay			52 00	1067 00							1119 00
Gowrie			1416 00	3600 00							5016 00
International					896 00						896 00
Lingan			532 00								532 00
Ontario			152 00	15 00							167 00
Reserve	45 00	6240 00	64 00	371 00	776 00	1457 00	922 00				9875 00
Sydney				608 00							608 00
Victoria		438 00	7800 00	87 00	298 00	4070 00	82 00				12775 00
Total	\$450 00	\$10383 00	\$12322 00	\$27095 00	\$7074 00	\$9410 00	\$7758 00	\$1021 00	\$729 00	\$3028 00	\$79270 00

MINES REPORT.

Statement of the Number and Classes of Men employed, and average results at each Colliery, during the year ended December 31, 1885.

COLLIERIES.	UNDERGROUND.				SURFACE.				CONSTRUCTION.				TOTAL.		Average No. of tons, per Cutter.	Average tons per day, per Cutter.	Average quantity raised per day.	HORSES.		PITS WORKED.
	Skilled Laborers.	Laborers.	Boys.	Days' Labor.	Skilled Laborers.	Laborers.	Boys.	Days' Labor.	Persons.	Days' Labor.	Above.	Below.								
CUMBERLAND Co.																				
Chignecto	7	2	2	2,854	1	5	1	2,243					18	5,097	869	3	23	1	1	260
Joggins	34	7	7	7,603	8	23	7	7,976	2			108	88	15,687	518	4	104	3	2	126
Minudie	18	7	3	5,476	5	5	2	2,907	1	1		260	42	8,643	427	1	32	1	1	234
Salt Springs																				
Spring Hill	292	153	99	142,875	45	92	17	40,361	9	11	1	4,828	719	188,064	1,147	4	1,288	8	28	260
Patrick	2	1		729	1	1	1	735	1			200	7	1,664		1	1	1		287
Maccan	2			181						1		86	3	267	121			1		60
Scotia	3			405	1	1	1	174					6	579	439	3	9	1		132
Lawson	1	1	1	360	1		1	150					5	510	115			2		
Pictou Co.																				
Acadia	91	91	25	47,616	20	40	6	18,527					273	66,143	1,078	5	415	8	5	212
Albion	200	110	59	76,861	66	101	34	54,335					570	131,196	645	2	520	17	13	248
Intercolonial	126	50	61	53,495	31	56	9	26,057	2	1		574	336	80,126	866	4	532	7	15	205
Vale	217	81	16	74,993	50	104	6	40,986					474	115,979	350	1	338	3	11	225
New Glasgow	2	1	1	973	1			357	1			30	6	1,360						
CAPE BRETON Co.																				
Barasois		2	1	729		1		148				62	5	939						
Blockhouse	24	2	14	4,775	10	20	3	7,862		1			73	12,637	461	4	119	5	6	93
Bridgeport	17	1	4	4,399	2	2	1	1,451	3	3	1	858	35	6,708	775	6	116	1	1	113
Caledonia	70	5	18	15,561	12	20	10	9,623	15	1	4	3,358	155	28,542	840	5	392	6	13	150
Franklyn	7	1	3	444	2	2	1	200					16	644				1		
Glace Bay	71	6	15	10,985	29	21	2	13,660					144	24,645	555	4	285	6	14	138
Gowrie	108	12	37	24,947	18	38	14	15,478					227	40,424	688	6	670	8	17	111
International	94	20	32	9,461	21	41	2	9,525					210	18,986	744	5	530	2	19	128
Lingan	48	4	13	11,709	2	21	10	8,191					98	19,900	453	2	128	3	8	169
Ontario	20	1	6	3,983	1	7	1	1,610					36	5,593	388	3	66	2	2	117
Reserve	116	12	33	31,529	14	22	8	10,162	5	3		2,425	213	44,116	717	5	616	8	12	135
Sydney	210	41	83	68,589	60	81	40	47,232					515	115,821	591	3	664	8	26	187
Victoria	83	23	7	28,967	8	42	5	16,407					168	45,374	573	1	159	4	3	298
INVERNESS Co.																				
Chimney Corner	2	1			1								4					1		
	1865	635	540	630,499	410	747	182	336,357	39	22	6	12,789	4,446	979,645	1,015	3	7,043	108	197	3,888

Nova Scotia Coal Sales, from 1785 to 1885 (inclusive.)

Year.	Sales.	Total.	Year.	Sales.	Total.	
1785	1,668	14,349	1841	148,298	Forw'd 1,208,177	
1786	2,000		1842	129,708		
1787	10,681		1843	105,161		
1788			1844	108,482		
1789			1845	150,674		
1790			1846	147,506		
1791	2,670		1847	201,650		1,533,798
1792	2,143		1848	187,643		
1793	1,926		1849	174,592		
1794	4,405		1850	180,084		
1795	5,320	51,048	1851	153,499		
1796	5,249		1852	189,076		
1797	6,039		1853	217,426		
1798	5,948		1854	234,312		
1799	8,947		1855	238,215		
1800	8,401		1856	253,492		
1801	5,775		1857	294,198	2,399,829	
			1858	226,725		
			1859	270,293		
			1860	322,593		
		1861	326,429			
		1862	395,637			
		1863	429,351			
		1864	576,935			
		1865	635,586			
		1866	558,520			
1811	8,516	70,452	1867	471,185	4,927,339	
1812	9,570		1868	453,624		
1813	9,744		1869	511,795		
1814	9,866		1870	568,277		
1815	9,336		1871	596,418		
1816	8,619		1872	785,914		
1817	9,284		1873	881,106		
1818	7,920		1874	749,127		
1819	8,692		1875	706,795		
1820	9,980		1876	634,207		
1821	11,388	91,527	1877	697,065	7,377,428	
1822	7,512		1878	693,511		
1823	27,000		1879	688,628		
1824			1880	954,659		
1825			1881	1,035,014		
1826			1882	1,250,179		
1827	12,600		1883	1,297,523		
1828	12,149		1884	1,261,650		
1829	20,967		1885	1,254,510		
1829	21,935		140,820	Total...		23,545,447
1830	27,269					
1831	37,170					
1832	50,396					
1833	64,743					
1834	50,813					
1835	56,434					
1836	107,593					
1837	118,942					
1838	106,730					
1839	145,962	839,981				
1840	101,198					

SUMMARY.

1785 to 1790.....	14,349	1831 to 1840.....	839,981
1791 to 1800.....	51,048	1841 to 1850.....	1,533,798
1801 to 1810.....	70,452	1851 to 1860.....	2,399,829
1811 to 1820.....	91,527	1861 to 1870.....	4,927,339
1821 to 1830.....	140,820	1871 to 1880.....	7,377,428

COAL.

NOVA SCOTIA EXPORTED TO THE UNITED STATES.

Years.	Tons.	Duty.	Years.	Tons.	Duty.
1850	118,173	24 ad.	1868	228,132	\$1 25
1851	116,274	"	1869	257,485	"
1852	87,542	"	1870	168,180	"
1853	120,764	"	1871	165,431	"
1854	139,125	Free	1872	154,092	75
1855	103,222	"	1873	264,760	"
1856	126,152	"	1874	138,335	"
1857	123,335	"	1875	89,746	"
1858	186,743	"	1876	71,634	"
1859	122,720	"	1877	118,216	"
1860	149,289	"	1878	88,495	"
1861	204,457	"	1879	51,641	"
1862	192,612	"	1880	123,423	"
1863	282,775	"	1881	113,728	"
1864	347,594	"	1882	99,302	"
1865	465,194	"	1883	102,755	"
1866	404,252	"	1884	64,515	"
1867	338,492	\$1 25	1885	34,483	"

NOTE.—The quantities given for the years 1850 to 1872 are on the authority of the Board of Trade, Philadelphia, and are probably under estimated.

GOLD.—GENERAL STATEMENT FOR THE YEAR 1885.

Shewing the number of Mines, Days' Labor performed, quantities of Quartz crushed, yield of Gold, &c., for the year ended December 31st, 1885.

DISTRICTS.	Number of Mines.	Days' Labor.	Mills.	Steam Power.	Water Power.	Quartz, etc., crushed.	Yield per Ton.		Maxim Yield per Ton.		Total Yield of Gold.		Average yield per man per day for 12 months at \$18.00 per oz.	
							Oz.	Dwt. Gr.	Oz.	Dwt. Gr.	Oz.	Dwt. Gr.		
Caribou.....	3	8355	2	1	1	2239	0	11	1	18	1335	14	11	2.87
Darr's Hill.....	1	31713	1	....	1	10880	0	9	1	10	4924	0	0	3.10
Fifteen Mile Stream....	1	2479	2	....	2	898	0	9	0	17	424	15	6	3.08
Montagu	2	18908	1	1	....	2809	1	8	4	19	4001	6	2	3.80
Oldham	3	11777	1	....	1	1170	2	0	0	62	2360	12	5	3.60
Renfrew	2	5542	2	....	2	641	0	19	1	15	639	10	0	2.67
Sherbrooke	6	16050	2	1	1	2426	0	10	2	16	1238	11	0	1.38
Stormont	1	5891	1	1	....	707	1	4	0	9	863	15	10	2.63
Tangier	2	13729	2	2	....	874	0	9	0	17	431	9	14	0.56
Uniacke.....	2	4473	3	3	....	2010	0	5	7	11	576	0	12	2.31
Waverley	1	1135	1	1	....	223	0	15	2	0	170	2	6	2.68
Unproclaimed	5	38504	7	4	3	4013	1	6	1	12	5237	16	2	2.47
Total.....	29	157421	25	14	11	28890	0	15	4	62	22203	12	20	2.54

MONTHLY STATEMENT FROM EACH GOLD DISTRICT.

MONTH.	CARRIBOU.							DARR'S HILL.							FIFTEEN MILE STREAM.						
	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Grs.	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Grs.	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Grs.
January	2	784	31	138	62	19	0	1	2290	91	900	189	0	0	1	18	...	74	34	10	0
February	2	845	34	....	..	..	..	1	2319	92	860	215	0	0	1	79	3	88	58	0	0
March	3	395	16	130	39	7	12	1	2500	100	960	260	0	0	2	204	8	56	24	0	0
April	2	622	25	78	35	2	12	1	2342	92	856	247	0	0	2	186	7	167	63	10	0
May	3	1192	47	373	177	2	0	1	2317	91	843	414	0	0	1	225	9	270	116	10	0
June	3	805	33	104	45	13	0	1	2619	104	875	356	0	0	2	200	8	....	....	..	..
July	4	1183	47	146	89	4	1	1	2450	98	965	304	0	0	2	466	18	10	8	10	0
August	4	659	26	257	183	18	14	1	2900	116	960	725	0	0	1	353	14	40	17	0	0
September	4	659	26	145	160	12	8	1	3294	131	954	277	0	0	1	245	10	60	35	0	0
October	2	605	24	271	43	19	13	1	2590	103	937	498	0	0	1	206	8	45	21	10	2
November	2	309	12	356	240	1	6	1	2875	115	865	919	0	0	1	129	5	45	23	13	1
December	2	297	12	241	157	14	17	1	3217	130	905	520	0	0	1	168	6	43	22	12	3
Totals	3	8355	....	2239	1335	14	11	1	131713	...	10880	4924	0	0	1	2479	....	393	424	15	6

MONTHLY STATEMENT FROM EACH GOLD DISTRICT.—(CONTINUED.)

MONTH	MONTAGU.							OLDHAM.							RENFREW.						
	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Grs.	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Grs.	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Grs.
January	1	944	38	86	142	16	0	4	856	34	96	127	14	23	2	449	18	76	93	1	0
February ....	..	1030	41	123	212	5	0	4	1221	50	107	264	17	13	2	344	13	..	..	..	..
March .....	..	1014	41	171	351	16	0	5	1464	59	83	127	2	7	2	453	18	..	..	..	..
April	2	1167	46	60	148	8	0	3	1146	45	101	79	2	17	2	382	15	..	..	..	..
May	2	955	40	169	396	15	0	3	1226	50	119	111	9	14	2	485	19	56	98	15	0
June	2	2529	101	6	4	10	6	2	1139	45	156	124	9	16	2	393	16	135	165	19	0
July	2	1908	76	229	362	8	0	4	1123	45	100	330	16	17	1	416	16	..	..	..	..
August	1	1766	70	239	593	4	0	4	1139	45	46	298	17	0	1	581	23	..	..	..	..
September ..	1	2344	94	376	1384	5	0	3	1128	45	..	..	..	..	1	689	27	..	..	..	..
October	2	1980	77	459	164	16	5	2	495	18	123	508	0	16	2	493	20	17	3	7	0
November....	2	1725	69	451	135	17	15	2	390	16	123	127	17	2	2	415	16	120	98	0	0
December	2	1545	62	440	104	5	0	2	450	17	116	260	4	0	2	442	17	237	180	8	0
	..	18908	..	2809	4001	6	2	3	11777	..	1170	2360	12	5	2	5542	..	641	639	10	0

MONTHLY STATEMENT FROM EACH GOLD DISTRICT.—(CONTINUED.)

MONTH.	SHERBROOKE.							STORMONT.							TANGIER.						
	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Grs.	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Grs.	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Grs.
January	6	1809	72	211	162	2	0	2	792	31	75	175	19	0	2	1476	60	181	107	4	0
February	5	1440	58	171	117	15	0	2	853	34	69	146	6	0	2	1883	75	111	63	0	0
March	5	1430	57	122	88	15	0	1	602	24	50	77	12	0	2	1685	67	140	48	11	2
April	5	1456	58	130	90	10	0	2	622	25	60	89	18	0	2	939	39	13	6	3	0
May	6	1352	54	280	93	9	0	1	495	19	58	68	14	0	2	1120	45	41	17	17	12
June	7	1326	51	185	57	1	0	1	410	16	37	48	2	0	2	1448	59	.....	.....	..	..
July	10	1350	54	421	101	5	0	2	611	24	72	74	7	0	3	1460	59	.....	.....	..	..
August	9	910	36	112	30	3	0	1	322	13	58	63	4	0	2	386	15	.....	.....	..	..
September ..	6	1324	53	229	167	14	0	1	417	17	85	49	6	0	2	360	14	64	20	12	0
October	4	1080	43	136	120	0	0	2	327	13	27	13	5	10	2	1008	40	120	63	8	0
November	5	1196	47	212	108	0	0	1	284	11	83	39	18	0	2	1053	40	74	63	11	0
December	4	1377	55	217	101	11	0	1	156	9	33	17	4	0	2	911	36	130	41	3	0
Totals	6	16050	.....	2426	1238	11	0	1	5891	.....	707	863	15	10	2	13729	.....	874	431	9	14

MONTHLY STATEMENT FROM EACH GOLD DISTRICT.—(CONTINUED.)

MONTH.	UNIACKE.						WAVERLY.						UNPROCLAIMED, ETC.								
	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Grs.	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Grs.	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Grs.
January	1	198	8	54	9	15	0	..	....	....	....	....	..	..	8	2668	106	277	435	6	16
February	1	150	6	219	61	13	0	1	20	1	....	....	..	..	7	2465	98	132	71	3	15
March	1	100	4	52	21	3	0	1	60	2	4	6	9	0	9	3284	123	323	278	14	21
April	1	275	11	154	57	16	22	1	76	3	....	....	..	..	2	2166	86	466	259	0	0
May	2	295	12	98	26	19	0	1	68	3	8	6	9	0	4	2468	97	574	324	15	0
June	3	668	26	279	85	7	21	1	214	8	26	19	12	0	5	3068	123	417	356	4	18
July	3	575	23	245	78	0	0	1	148	6	20	19	4	0	7	3661	146	425	975	17	0
August	3	440	18	208	56	19	22	1	115	5	15	13	0	0	7	3830	152	404	783	4	0
September ..	3	552	22	205	65	14	21	1	247	10	109	83	0	6	7	3250	130	171	518	14	0
October	2	431	19	143	17	8	0	1	....	....	....	....	..	..	5	4133	165	369	595	13	4
November ..	3	382	15	179	40	9	7	1	....	....	41	22	8	0	4	3843	153	243	323	0	0
December	3	407	12	174	54	13	15	1	187	7	....	....	..	..	3	3668	143	212	316	3	0
Totals	2	4473	....	2010	576	0	12	1	1135	....	223	170	2	6	5	38504	..	4013	5237	16	2

GOLD.

GENERAL ANNUAL SUMMARY.

YEAR.	Total ounces of Gold extracted.			Stuff Crushed.	Yield per Ton of 2,000 lbs.			Total Days Labor.	Average earnings per man per day and year, at 300 working days, \$18 per oz.	
	Oz.	Dwt.	Gr.	Tons.	Oz.	Dwt.	Gr.		A day.	A year.
1862	7275	0	0	6473	1	2	11	156,000	\$ 83	\$249
1863	14001	14	17	17002		16	11	273,264	92	276
1864	20022	18	13	21434		18	16	252,720	1 42	426
1865	25454	4	8	24423	1	0	20	212,966	2 15	645
1866	25204	13	2	32161		15	2	211,796	2 14	642
1867	27314	11	11	31386		17	9	218,894	2 24	672
1868	20541	6	10	32262		12	17	241,462	1 53	459
1869	17868	0	19	35147		10	4	210,938	1 52	456
1870	19866	5	5	30829		12	21	173,689	2 05	615
1871	19227	7	4	30791		12	11	162,992	2 12	636
1872	13094	17	6	17093		15	7	112,476	2 09	627
1873	11852	7	19	17708		13	9	93,570	2 28	684
1874	9140	13	9	13844		13	5	77,246	2 12	636
1875	11208	14	19	14810		15	4	91,698	2 20	660
1876	12038	13	18	15490		15	13	111,304	1 94	582
1877	16882	6	1	17369		19	10	123,565	2 46	738
1878	12577	1	22	17990		13	23	110,422	2 05	615
1879	13801	8	10	15936		17	8	92,002	2 34	702
1880	13234	0	4	14037		18	20	103,826	2 18	654
1881	10756	13	2	15556		12	20	126,308	1 52	456
1882	14107	3	20	22081		12	18	106,884	2 37	711
1883	15446	9	23	25954		10	21	97,733	2 84	862
1884	16059	18	17	25147		12	18	118,087	2 40	720
1885	22203	12	20	28890		15	4	157,421	2 53	759
Total.	389180	4	15	524813	.....			3,637,614	.....	.....

INTERCOLONIAL RAILWAY.

Statement showing the quantities, in tons, of the different kinds of Coal received from the various Mines for the use of the Intercolonial Railway, during the year 1885.

MONTHS.	ACADIA.	ALBION.			CHIGNECTO.	DREMOND.	SPRING HILL.			VALE.	
		Round.	Small.	Coke.			Run of Mine.	Small.	Round.	Round.	Small.
January	2589	24	.....	.....	21	1421	.....	.....	6761	.....
February	5778	25	9	.....	.....	3089	20	12	2043	.....
March	3802	75	.....	18	.....	2987	.....	11	2424	.....
April	4459	37	.....	.....	16	6107	.....	.....	4347	.....
May	2525	158	.....	.....	.....	6558	.....	.....	3098	.....
June	1784	.....	12	.....	.....	9902	.....	.....	5213	.....
July	89	21	.....	.....	.....	.....	.....	4775	5225	.....
August	10	.....	.....	.....	.....	.....	6284	3553	.....
September	114	12	.....	.....	.....	.....	10048	5982	.....
October	150	.....	.....	.....	.....	.....	7541	6801	.....
November	15	.....	.....	.....	.....	80	6896	5317	.....
December	14	.....	.....	.....	57	7755	6470	11
Totals	21,026	629	47	18	37	30,064	157	43,322	57,234	11

MONCTON, N. B., January 28th, 1886.

INTERCOLONIAL RAILWAY.

STATEMENT, showing the number of tons of Coal received from Mines in Nova Scotia during the year ending the 31st December, 1885.

STATIONS.	No. TONS.	STATIONS.	No. TONS.
Halifax	40232	Moncton	13984
Bedford	454	Salisbury	1445
Windsor Junction	5138	Peticodiac	285
Wellington	98	Penobsquis	1036
Enfield	227	Sussex	558
Elmsdale	200	Apohaqui	18
Milford	77	Norton	28
Shubenacadie	283	Passekeag	14
Stewiacke	553	Hampton	650
Brookfield	89	Rothsay	138
Truro	6579	Coldbrook	4915
Valley	12	St. John	24203
Riversdale	10	Berry's Mills	22
West River	12	Weldford	24
Glengarry	18	Kent Junction	467
Hopewell	1230	Chatham Junction	334
Stellarton	47	Derby	36
New Glasgow	14093	Newcastle	69
Pictou Landing	48433	Bathurst	500
Belmont	58	Petite Roche	22
East Mines	72	Jacquet River	16
Londonderry	43275	New Mills	24
Wentworth	30	Charlo	6
Greenville	33	Dalhousie Junction	80
Thomson	18	Campbellton	146
Oxford	406	Little Metis	6
River Philip	6	St. Octave	6
Athol	6	Ste. Flavie	31
Maccan	45	St. Luce	4
Nappan	105	Rimouski	154
Amherst	3359	Trois Pistoles	19
Aulac	255	Riviere du Loup	59
Sackville	1868	St. Paschal	13
Dorchester	945	St. Charles	12
Memramcook	336	St. Henri	5508
Painsec Junction	6	Pointe Levis	15620
Shediac	264	Chaudiere (Local)	76054
Point du Chene	51	" (West of)	68609
			384338

From the following Stations :

STATIONS.	No. TONS.
Drummond	24260
Hopewell	1527
Stellarton	80514
New Glasgow	24960
Spring Hill	248903
Maccan	4174
Total	384338

19363 tons of Coke forwarded from Stellarton to Londonderry.

MONCTON, N. B., *January 28th, 1886.*

MINERALS OTHER THAN THOSE LEASED FROM THE CROWN.

* GYPSUM.

Windsor	Tons.	60,628	Value.....	\$60,628
Cheverie	"	20,292	"	15,095
Walton	"	1,717	"	1,324
† St. Ann's, C. B.	"	2,790	" .....	....
Arichat (Lennox Passage).....	"	2,000 ?	"	2,000
Halifax	"	217	"	1,839
† Walton	"	1,400	"	910

* BUILDING STONE.

Antigonish	Tons.	36	Value.....	\$ 144
Pictou	"	71	"	213
Wallace	"	3,720	"	17,592
		3,827		\$17,949

GRINDSTONES, ETC.

Lower Cove, } A. Seaman & Co. }	Tons.	2,058	Value.....	\$28,812
* Parrsboro	"	150	"	150
		2,208		\$28,962

* MANGANESE.

Tenny Cape, Hants Co.....	Tons.	100	Value.....	\$ 1,845
Windsor, "	"	26	"	
Walton, "	"	27½	"	1,810
East Mountain, Colchester Co..	"	120	"	9,000
Loch Lomond, C. B.	"	20	"	
Bridgeville, Pictou Co.....	"	60	"	6,600
		353½		

Average number of men employed.....12

* ANTIMONY.

Rawdon	Tons.	758	Value.....	\$33,095
--------------	-------	-----	------------	----------

* Amounts exported.

† Barrels ground Plaster.

‡ Tons extracted, 3,000.

IRON MINING.

Londonderry	48,033 tons.
Bridgeville, Pictou Co.....	83 "
Annapolis	13 "
	<hr/> 48,129

AVERAGE FORCE EMPLOYED DAILY.

Skilled workmen :

	No. of men.	Days Worked.
Under ground	79	21,661
Above ground	21	6,210

Unskilled workmen :

Under ground	28	7,732
Above ground	69	18,516

Total.....	197	54,119
------------	-----	--------

LIMESTONE (*Partial.*)

Pugwash.....	Tons.	215
St. Peter's	"	500
Londonderry (ankerite)	"	2,335
Brookfield*	"	13,379

BARYTES.

Henderson & Potts, }		
Brookfield. }	.....Tons.	300

Average force employed daily..... 3

* About 50,000 barrels of lime were burned in P. E. Island for agricultural purposes from Nova Scotia limestone.

EXPORTS FROM HALIFAX.

Products of the Mine year ending December 31st, 1885.

	Produce of Canada.		Not Produce of Canada.	
Coal	Tons.	22,713 \$ 72,532		
Gold .....		.... 397,902		
Gold Quartz.....		.... 150		
Gypsum	Tons.	217 1,839		
Oils, Mineral	Gals.	1,485 486	1,396 \$ 170	
Antimony	Tons.	758 33,095		
Manganese	Tons.	22 1,399		
Salt	Bush.	.... ....	29,652 6,129	
		\$507,403		\$6,299

FINANCIAL STATEMENT.—GOLD, &c.

Mines Department for twelve months ended 31st December, 1885.

DISTRICTS.	RECEIPTS.			EXPENDITURE.				
	Rents.	Royalty.	Total.	Return Rents.	Return Royalty.	Royalty Commission.	Salaries and Surveys.	Total.
Caribou	\$114 00	\$ 281 59	\$ 395 59	.....	.....	\$ 9 68	.....	\$ 9 68
Darr's Hill .....	.....	1473 12	1473 12	.....	.....	.....	.....	.....
Fifteen Mile Stream	372 00	.....	372 00	.....	.....	.....	.....	.....
Gay's River	2 00	.....	2 00	.....	.....	.....	.....	.....
Lawrencetown	24 00	.....	24 00	.....	.....	.....	.....	.....
Montague	178 00	1416 72	1594 72	.....	.....	78 88	\$ 11 60	11 60
Oldham	220 00	795 68	1015 68	.....	.....	31 17	10 00	88 88
Ovens	18 00	2 25	20 25	\$ 2 00	.....	.....	40 00	71 17
Renfrew	52 00	209 90	261 90	.....	.....	10 51	.....	2 00
Sherbrooke	278 00	471 91	749 91	32 00	.....	24 03	32 00	42 51
Stormont	612 00	362 47	974 47	.....	.....	10 98	400 80	456 83
Tangier	16 00	302 92	318 92	.....	.....	12 76	37 00	47 98
Uniacke .....	.....	70 69	70 69	.....	.....	12 56	.....	12 76
Waverly	244 00	36 35	280 35	.....	.....	90	130 00	142 56
Wine Harbor	162 00	35 37	197 37	.....	\$ 19 64	1 77	.....	20 54
Unproclaimed	1362 00	1624 14	2986 14	24 00	184 84	63 48	.....	1 77
Prospecting Licenses .....	.....	.....	4459 01	.....	.....	.....	315 57	587 89
	\$3654 00	\$7083 11	\$15196 12	\$58 00	\$204 48	\$256 72	.....	262 41*
							\$ 976 97	\$1758 58

*Return.

OTHER THAN GOLD.

Mines Department for twelve months ended 31st December, 1885.

COUNTIES.	RECEIPTS.				EXPENDITURES.		
	Licenses to Search.	Licenses to Work.	Royalty.	Totals.	Ret'n Licenses to Search.	Salaries and Surveys.	Totals.
Annapolis	\$ 20 00	.....	.....	\$ 20 00	.....	.....	.....
Antigonish	120 00	\$ 50 00	.....	170 00	.....	.....	.....
Cape Breton	240 00	350 00	\$ 42118 42	42708 42	.....	\$ 946 70	\$ 946 70
Colchester	140 00	.....	.....	140 00	.....	.....	.....
Cumberland	240 00	250 00	26147 79	26637 79	.....	720 00	720 00
Digby	40 00	.....	.....	40 00	.....	.....	.....
Guysborough	60 00	.....	.....	60 00	.....	.....	.....
Halifax	20 00	.....	.....	20 00	.....	.....	.....
Hants	120 00	.....	.....	120 00	.....	.....	.....
Inverness	200 00	25 00	9 70	234 70	.....	.....	.....
Kings .....	.....	.....	.....	.....	.....	.....	.....
Pictou	560 00	.....	33135 34	33695 34	\$20 00	472 00	492 00
Richmond .....	.....	50 00	.....	50 00	20 00	.....	20 00
Victoria	40 00	25 00	.....	65 00	.....	.....	.....
Yarmouth	20 00	.....	.....	20 00	.....	.....	.....
Examinations .....	.....	.....	.....	52 00	.....	.....	217 92
Fines .....	.....	.....	.....	.....	.....	.....	36 67
	\$1820 00	\$750 00	\$ 101,411 25	\$ 104,033 25	\$40 00	\$2138 70	\$2433 29

ABSTRACT ACCOUNT.

Receipts and Expenditure for the twelve months ended 31st December, 1885.

RECEIPTS.		EXPENDITURE.	
Licenses to Search.....	\$ 182,000 00	Return Licenses to Search.....	\$ 40 00
" Work	750 00	Salaries and Surveys.....	2138 70
Royalty	101,411 25	Fines	36 67
Examinations	52 00	Examinations	217 92
	<u>\$104,033 25</u>		<u>\$ 2433 29</u>
Rents	\$ 3654 00	Return Rents.....	\$ 58 00
Royalty	7083 11	" Royalty	204 48
Prospecting Licenses.....	14459 01	Royalty Commission.....	256 72
	<u>\$ 15196 12</u>	Salaries and Surveys.....	976 97
		Return Prospecting Licenses.....	262 41
			<u>\$ 1758 58</u>
		General Expenses.....	\$4906 08
		Postage	131 00
		Stationery and Printing.....	930 18
			<u>\$ 5967 26</u>
			<u>\$10159 13</u>

REPORT
OF THE
DEPARTMENT OF MINES,
NOVA SCOTIA,
FOR THE YEAR 1886.



HALIFAX, N. S.
COMMISSIONER OF PUBLIC WORKS AND MINES,
QUEEN'S PRINTER.
1887.

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DEPARTMENT OF MINES.

REPORT FOR THE YEAR 1886.

*To His Honor Matthew H. Richey, Esq., Lieutenant-Governor of the
Province of Nova Scotia, &c., &c., &c.*

MAY IT PLEASE YOUR HONOR,—

I respectfully present herewith to Your Honor the Annual Report of the Inspector of Mines, containing an account of the progress of mining operations, together with statistical information compiled by him from official and other returns.

I remain,

Your Honor's obed't servant,

CHARLES E. CHURCH,
Commissioner of Public Works and Mines.

HALIFAX, March 2nd, 1887.

REPORT

ON THE

MINES OF NOVA SCOTIA.

By EDWIN GILPIN, JR., A.M., F.G.S., F.R.S.C.,

INSPECTOR OF MINES.

(*Member of the American Institute of Mining Engineers, etc.*)

OFFICE OF INSPECTOR OF MINES,
HALIFAX, March 1st, 1887.

TO THE HONORABLE

CHARLES E. CHURCH, M. P. P., M. E. C.,

Commissioner of Public Works and Mines.

SIR,—I beg leave to submit the following report on the Mines and Minerals of Nova Scotia, and the progress of mining, during the year 1886.

The following summary shows, so far as I have been able to learn, the mineral production of Nova Scotia during the year 1886, compared with that of the previous year :

		1885.	1886.
Gold.....	Ounces....	22,203	23,362
Iron Ore.....	Tons.....	48,129	44,388
Manganese Ore.....	"	353½	427
Barytes	"	300	230
*Antimony.....	"	758	645
Coal raised.....	"	1,352,205	1,502,611
*Gypsum	"	87,644	123,753
Building Stone.....	" ...	3,827	8,000
Coke made	"	30,185	31,604
Limestone.....	"	16,429	20,265
Grindstones, etc	"	2,208	1,600
*Moulding Sand.....	" .....	.....	200

* Amount exported.

Through the kindness of the Collectors of Customs at the various ports of the Province, I am enabled to give further information under this head at the end of the report.

I also beg to enclose the reports of W. Madden, Jr., Esq., Deputy Inspector of Mines for the District of Cumberland, Colchester and Pictou Counties; and of Patrick Neville, Esq., Deputy Inspector of Mines for the Island of Cape Breton. These gentlemen have paid regular visits to the mines in their respective districts, and report that generally every attention is paid to the observance of the Mines Regulation Act.

Their reports this year contain some interesting statistics of the pumps used for freeing our coal mines from water, the dimensions of the pumps, supply of steam, burden, and total amounts pumped being given in tabular form.

During the year 1885-6 the working of our coal mines was continued steadily, and presents few new features of interest. The discovery of gold bearing veins in the counties of Lunenburg, Queens, and Yarmouth, has led to the opening of several promising mines, at Whiteburn, Brookfield, Carlton, etc., and it is confidently expected that the year 1887 will see a number of equally valuable finds.

I regret that I am unable to chronicle any further advance in the development of our most important resource, the iron ore deposits. The works at Londonderry have continued as usual, and it is expected that before long a renewed impetus will be given to their operations which are closely allied to the chief source of our mineral revenue.

In accordance with arrangements entered into between Sir Charles Tupper, chairman of the Canadian Commission for the Colonial and Indian Exhibition, and your honorable Government, it was agreed that as complete an exhibit as possible of the mineral productions of this Province should be forwarded to the Exhibition, and shown *en bloc* as part of the Canadian mineral exhibit. The names of all parties desiring to exhibit in this manner through the Government of Nova Scotia were to be attached to their specimens, and they retained all rights and privileges of ordinary exhibitors.

As the understanding was arrived at near the close of the year 1885, and an early date was fixed for the shipment of specimens, the Provincial collection was not nearly as complete as could be desired. At least twelve months are required for the proper collection of a systematic set of the economic minerals of Nova Scotia. The collection was made with all possible speed, and reached the Exhibition safely, and was much admired by mining men and others connected with metallurgy, etc.

As usual, a generous assistance was given by the various coal companies, and large and handsome specimens were secured. The following list from the official catalogue will give an idea of the extent of the Provincial Exhibit:—

- General Mining Association, Sydney Mines—1 block Coal, 1200 lbs.
 Low Point, Barasoi's, and Lingan Mining Co., Cape Breton—1 block of Coal, 1000 lbs., from Low Point Mine. 1 block of Coal, 1000 lbs., from Lingan Mine.
 International Coal Mining Co., Bridgeport, Cape Breton—1 block of Coal, 1000 lbs.
 Sydney & Louisburg Coal and Railroad Co., Reserve Mines, Cape Breton—1 block of Coal, 400 lbs.; sample of Coke, 200 lbs.
 Glace Bay Mining Co., Glace Bay, Cape Breton—1 block of Coal, 300 lbs.
 Gowrie Coal Mining Co.—1 block Coal, 400 lbs.; sample Patent Fuel; Coal Fossils.
 Old Bridgeport Mines, Cape Breton—1 Block of Coal, 300 lbs.
 Cumberland Railway and Coal Co., Springhill, Cumberland County—1 column of Coal, 11 feet high; 1 block of Coal, 200 lbs.; sample of Nut Coal, 120 lbs.; 1 block of Coal, 900 lbs.
 Joggins Coal Mining Co., Cumberland County—1 column of Coal, 1000 lbs.
 Halifax Company, limited, Albion Mines, Pictou County—sample of Coke; 1 block "McGregor Coal; Sample "McGregor" Nut Coal; Sample "Third Seam" Coal—900 lbs.
 Vale Coal Co., New Glasgow, Pictou County—sample of "McBean" Coal, 250 lbs.; sample of "six feet" Coal, 250 lbs.
 Acadia Coal Co., Stellarton, Pictou County—sample Acadia Coal, large, 250 lbs.; sample Acadia Coal, Nut, 250 lbs.
 Intercolonial Coal Mining Co., Westville, Pictou County—sample of Acadia Coal, large, 250 lbs.; sample Acadia Coal, Nut, 250 lbs.
 R. H. Brown, Sydney Mines, Cape Breton—Coal Fossils.
 J. H. Bartlett, Springville, Pictou County—Spathic Iron Ore, 200 lbs.; Specular Iron Ore, 200 lbs.; Limonite Iron Ore, 200 lbs.; Red Hematite Iron Ore, 200 lbs.; Red Hematite Iron Ore, 200 lbs.
 The Government of Nova Scotia—Red Hematite, 150 lbs., Stewiacke, Colchester County.
 Chas. Kenny, Salmon River, Guysboro County—Specular Iron Ore, 200 lbs.
 Thomas Callahan, Manchester, Guysboro County—Specular Iron Ore, 200 lbs.
 A. Cumming, Melrose, Guysboro County—Specular Iron Ore.
 E. T. Moseley, Sydney, Cape Breton—Red Hematite.
 Government of Nova Scotia—Chilled Iron, Londonderry Mines, Colchester County; Bog Iron Ore, Liverpool, Queen's County.
 D. McLaughlin, Shubenacadie—Argentiferous Galena, Smithfield, Colchester County; Marble, 100 lbs., Marble Mtn., Cape Breton; Marble, 100 lbs. Marble Mtn., Cape Breton; Lime from above.
 Gypsum Rock, Shubenacadie, Hants County; Plaster made from above.
 E. W. Dimock, Windsor, Hants County—Gypsum, 200 lbs., Windsor.

STEEL COMPANY OF CANADA.

Londonderry, Colchester Co.—Rolled Axle Blank, prepared for the hammer, made from puddled iron, squeezed in rotary squeezer and rolled into puddled bar, 5 in. wide, $\frac{11}{16}$ in. thick and 4 in. wide, $\frac{11}{16}$ thick. Piled—9 in. wide, 10 tiers high. Heated in re-heating furnace on a sand bottom, rolled in an 18 in. train, and subject to the following tests:—

Four blows at 9 feet and two blows at 11 feet of a 2000 lbs. weight, striking midway between solid iron supports placed 3 feet apart. Blank turned over after each blow. The deflection after each blow was found to be as follows:—

1 st blow, defection	$1\frac{5}{8}$,	drop of 9 feet, weight 2000 lbs.
2nd " "	$2\frac{3}{8}$, " "	" "
3rd " "	$2\frac{1}{8}$, " "	" "
4th " "	$2\frac{7}{16}$, " "	" "
5th " "	$2\frac{5}{8}$, " "	" "
6th " "	$2\frac{5}{8}$, " "	" "
7th " "	$4\frac{1}{2}$, " "	" "

Taken thence to hydraulic press and bent until the ends came into contact, without showing the least fracture, weighing about 300 lbs.

1 Puddled Ball, weighing about 165 lbs.

1 Puddled Bloom " " 205 lbs.

SAMPLES BAR IRON.

1 Piece	$2\frac{1}{4}$	inches square, Sieman's iron.
1 "	$3 \times 1\frac{1}{4}$	" " "
1 "	$\frac{5}{8} \times 1\frac{1}{2}$	" " "
1 "	$\frac{7}{8}$	" round, "
1 "	$\frac{1}{2}$	" " " tied in a knot.
1 "	$\frac{1}{4}$	" " " "
1 "	$1 \times \frac{7}{8}$	" Sieman's Horse Shoe iron.
1 "	$\frac{7}{8} \times \frac{1}{2}$	" " "
2 "	$3 \times 1\frac{1}{6}$	" Muck Bar, weighing about 150 lbs.
1 "	6×1	" Siemen's iron.
1 "	4×1	" "
1 "	$1 \times \frac{7}{8}$	" "
1 "	$3 \times 1\frac{1}{4}$	" "
1 "	$\frac{3}{4}$	" round, "
1 "	1	" " "
1 "	$1\frac{1}{4}$	" square, Siemen's Best iron.
1 "	$1\frac{1}{8}$	" " " "
2 "	$1\frac{1}{4} \times 1\frac{3}{8}$	" Siemen's Link iron for cars, weighing about 150 lbs.

The latter stood the following tests, viz.:—

- Ultimate tensil strength, 53,947 lbs. per square inch.
 Reduction at point of fracture, 31 per cent.
 Elongation in 12 inch diameters, 26 "
 1 Link $1\frac{1}{4} \times 1\frac{3}{8}$, ready for use.
 1 Piece $1\frac{1}{4} \times 1\frac{3}{8}$, Siemen's Link iron, cold bent.
 1 Piece Brown Hematite Ore from West Mine, weighing about 5000 lbs.
 2 Pieces Specular Ore and 2 pieces Red Hematite Ore, East Mine, weighing about 2000 lbs.
 3 Pieces Spathic Ore, from West Mine, weighing about 2000 lbs.
 2 Pieces Brookfield Limestone.
 2 " West Mine "
 1 " Ankerite.
 1 Boulder "

The latter occuring in the Brown Hematite—weighing in all about 900 lbs.

- 1 Piece Totten Ore, from East Mine, being a mixture of Ankertite, Spathic and Hematite Ore, weighing about 800 lbs.
 1 Piece Brown Hematite, from West Mine, weighing about 2000 lbs.
 1 Bar No. 1 Pig Iron.
 1 " " 2 "
 1 " " 3 "
 1 " " 4 "
 1 " Car Wheel iron, weighing about 500 lbs.

ANALYSIS OF ORES, ETC.

	Brown Ore.	Totten Ore.	Specular Ore.
Insoluble Matter.....	15.97	1.95	0.58
Ferric Oxide	67.04	13.82	99.39
Ferrous Oxide.....	....	4.26	0.32
Alumina.....	3.62	1.13	
Maganese.....	....	0.86	
Maganic Dioxide.....	1.90	....
Lime	0.41	33.31	
Magnesia	0.18	6.09	
Carbonic Anhydride.....	....	34.77	
Water of Hydration.....	10.17	3.20	Trace.
	<hr/> 99.29	<hr/> 99.39	<hr/> 100.29
Metallic Iron.....	46.93	12.98	69.81
	Spathic Ore.	Ankerite.	
Insoluble Matter.....	....	0.19	
Calcic Carbonate.....	1.92	54.96	
Ferrous Carbonate	68.15	21.92	
Maganous Carbonate	1.87	1.29	

	Spathic Ore.	Ankerite.
Magnesian Carbonate.....	28.16	21.42
Ferric Oxide .....	.....	1.05
	<hr/> 100.00	<hr/> 100.83

	Limestone (Bookfield.)
Silica	Trace
Lime.....	54.54
Oxide Iron and Alumina.....	2.70
Magnesia .....	.94
Carbonic Acid	42.85
	<hr/> 101.03

- G. Clough, Lennox Passage, Cape Breton—Gypsum, 50 lbs.
 Government of Nova Scotia—Polished Gypsum, Windsor, Hants County. Concretionary Limestone, New Glasgow, Pictou County. Two samples Polished Marble, Cape Breton.
 E. T. Moseley, Sydney, Cape Breton—Pyrolusite, Loch Lomond, Cape Breton County.
 J. W. Stephens, Tenny Cape, Hants County—Two samples Manganese Ore, 200 lbs., Tenny Cape, Hants County.
 Alexander Carter, Truro, Colchester County—Sample Manganese Ore, 100 lbs.
 J. Browne, Spring Hill, Pictou County—Sample Manganese Ore, 35 lbs.
 Henderson & Potts, Halifax, N. S.—Sample Barites, 100 lbs.; Sample Paint.
 Coxheath Copper Mining Company, Sydney, Cape Breton—Copper Pyrites, 200 lbs; Copper Matte; Iron Ore, Flux.
 Limestone, Flux; Slag from Copper Ore; Assays, Charts, Photos, etc.
 L. Johnstone, Stellarton, Pictou County—Copper Ore—Ohio, Antigonish County.
 Government of Nova Scotia—Copper Ore—Polson's Lake, Guysboro' County.
 H. S. Poole, Stellarton, Pictou County—Cabinet Iron Ores.
 R. P. Fraser, Pictou, N. S.—Copper Ore—College Lake, Antigonish County.
 M. F. Eagar, Halifax, N. S.—Cabinet Nova Scotia Minerals.
 J. M. Ruggles, Lockeport—Cabinet Nova Scotia Minerals.
 B. M. Davidson, Rawdon, Hants County—Block Antimony Ore, 1000 lbs.
 Scotia Mining Company, Sydney, Cape Breton—Mica.
 J. Grant, Halifax, N. S.—Samples Magnetite, Copper, and Lead Ores.
 C. B. Whidden, Antigonish—Sandstone; Limestone.
 Government of Nova Scotia—Mineral Map of Nova Scotia, 12 ft. by 4 ft.
 Government of Nova Scotia—Obelisk showing gold taken from Nova Scotia Mines since 1862.
 Government of Nova Scotia—Sample Auriferous Quartz. Montague Halifax County.

Albion Gold Mining Company—Sample Auriferous Quartz.

F. W. Christie, Bedford, Halifax County—Auriferous Alluvium, 1 cubic foot—Ovens, Lunenburg County.

A. A. Hayward, Renfrew, Hants County—Samples Auriferous Quartz.

Dufferin Gold Mining Company, Salmon River, Halifax County—Sample Auriferous Quartz.

Kemptonville Gold Mining Company, Yarmouth N. S.—Auriferous Quartz.

Rhodes, Curry & Co., Amherst, Cumberland County—Sandstone—Amherst.

Had time allowed a much better collection of building stones, clays, ochres, slates, etc., etc., could have been gathered.

I venture to draw your attention to that part of the Mines and Minerals Act relating to the granting of Prospecting Licenses for Gold. These licenses are granted for six months, with an option of renewal. Their location and renewal has led to much confusion and trouble in new districts, as they are frequently selected almost at random for speculative purposes, and mistakes arise when portions of them are selected for leasing, etc. In view also of the large extent of ground covered by leases which are practically unforfeitable, the following suggestion may be worth consideration. This is briefly that the system of granting prospecting licenses be abolished, that leases be issued for any term decided on say 20 or 30 years to be held by labor or annual rental. That on the non-performance of the labor or non-payment of the rental the lease be thereby forfeited without recourse to any court of investigation or forfeiture. To give an opportunity to those who may be desirous of prospecting, the cost of the lease for the first year could be made the same as that of a prospecting license of equal extent, but if the lessee desired to continue his operations he should then before the close of the first year secure the continuation of the lease for another year by payment of the permanent rental, and so on. An arrangement similar to this would on the basis of a small annual rental of say \$1.00 an area prove a boon to the prospector, for under the present arrangement he would pay for a prospecting license of one area for 12 months, 75 cents, then for a lease \$2.00 in all \$2.75. This secures him the ground for say two years; if he did not work his lease would be liable to forfeiture. Under the proposed arrangement the same sum would secure to him his area for three years. This arrangement would also give the Province a revenue from the numerous unworked leases now hindering exploration and probable discovery of valuable ground in all our mining districts, stimulate the holders to work, and give a security and fixity of title to leases which is desirable in the interests of investors. Provision could be made to protect properties on which any temporary cessation of work was necessary, or which were in litigation, and to prevent injustice to any prior occupant who had made any bonafide expenditure.

COAL TRADE.

The total sales for the year 1886 amounted to 1,373,666 tons, made up of 789,006 tons of round, 305,322 tons of run of mine, and 279,338 tons of slack coal, as compared with 1,254,510 tons sold during the year 1885.

The following are the most noticeable points in the coal trade.

The home sales were 460,237 tons compared with 444,652 tons in 1885 and 493,050 tons in 1884.

The Province of Quebec took 538,762 tons, against 493,917 tons in 1885, and 396,782 tons in 1884.

The sales to New Brunswick were 175,918 tons compared with 148,634 tons in 1885.

Newfoundland took 71,476 tons, against 74,322 tons in 1885.

The sales to Prince Edward Island were 49,168 tons against 52,770 tons during the preceding year.

The West Indian sales were 16,721 tons compared with 5,732 tons in 1885.

The sales to the United States comprise 22,127 tons of round 35,479 tons of slack, and, 3,040 tons of run of mine coal, compared with 10,497 of round and 23,986 of slack during the previous year.

The increased sales to the United States were largely due to the strike among the coal mines in the spring. Had the strike taken place a few weeks later very large amounts would have been shipped, but the opening of navigation was retarded by drift ice, and the coal sent forward went in the early part of the second quarter, the total shipments to the end of that quarter being 38,697 tons.

CUMBERLAND COUNTY.

The total sales of this county amounted to 416,266 tons, against 340,535 tons in 1885, and 258,405 tons in 1884.

The home sales were 103,886 tons against 83,953 tons in 1885.

The sales to New Brunswick were 118,088 tons, compared with 92,872 tons during the preceding year.

The Province of Québec took 188,935 tons, as compared with 163,303 tons in 1885.

COLLIERIES.

Chignecto.—During the past year a few men have been employed in getting a small amount of coal, and in keeping the pit in order. The roof and upper portion of this seam at this mine, as well as at the Scotia colliery, contains a good deal of pyrites and clay, which gradually heats and takes fire if water finds access to it. These smouldering fires have given much trouble along the crop working in this seam, but hitherto the deeper workings of the Chignecto mine have been free from them. Last fall however it was found necessary to build off some of the bords in No. 4 Balance, as there were plain signs of heating. Arrangements have been made to keep both air and water from passing into the heated bords, and it is anticipated that no serious results will ensue.

Joggins.—Work has been continued as usual during the year, and the levels have been extended to the faults. The output was 22,243, against 17,664 tons in 1885.

A little work has been done at the Minudie, Milner & Lawson mines.

At the Patrick mine, near Maccan, some prospecting work during the summer showed the outcrop of a seam of coal said to contain six feet of coal with a shaley coal parting, the bottom bench two feet thick being a canneloid coal, and apparently well adapted for gas. The coal is of excellent quality, as appears from the following analysis:

Moisture.....	1.00
Volatile Combustible Matter	55.61
Fixed Carbon.....	35.90
Ash.....	7.00
	<hr/>
	100.00
Sulphur.....	.50

and the work of preparing the mine for regular mining was continued.

At the Styles mine the slope is now down 130 feet in the dip, which is about 44°. The seam contains 4 feet 2 inches of coal, with two bands of shale.

Springhill.—The Cumberland Railway and Coal Company have greatly enlarged their operations during the past year. The output was 416,769 tons, compared with 335,055 tons in 1885.

The Barlow seam as opened by a trial pit proved to be eleven feet thick. Arrangements are being continued to put the syndicate slope in a position for a regular output. The deepening of the East Slope will open a large field of excellent coal.

The negotiations for the construction of a railway from the Intercolonial railway at Maccan to the Joggins mines have been followed by an active construction. The road crosses the Maccan River near the highway bridge, and from this point to the Joggins shore it follows closely the outcrop of the band of strata which carry the coal seams. Its completion will give ample facilities for an all winter outlet via Maccan, and presumably shipping accommodation will be provided where the line touches deep water.

PICTOU COUNTY.

The total sales were 369,026 tons, against 396,000 tons in 1885.

The home sales were 202,516 tons, against 209,428 tons in the preceding year.

The Province of Quebec took 95,499 tons compared with 145,363 tons in the year 1885.

The sales to Newfoundland, Prince Edward Island and New Brunswick present no new features of interest.

COLLIERIES.

Acadia Coal Company.—The company bearing the name of the Acadia Coal Company, formerly working the colliery known by that name, now includes, pursuant to an amalgamation effected last year, the Collieries of the Halifax Company, commonly known as the Albion Mines, and those of the Vale Coal, Iron and Manufacturing Company. The present Acadia Company has now five large Collieries in running order and controls the areas formerly held by the companies referred to above. Mr. H. S. Poole continues as Agent for the Consolidated Company, and his new work will doubtless be marked by the success which has attended his management of the old Acadia Colliery. It is to be anticipated that by a concentration of shops, stores, offices, etc., etc., a perceptible reduction will be effected in the cost of the coal.

Acadia—Work has been carried on steadily during the past year, and the extraction of coal in the new lift systematically pursued. The output was 98,891 tons, compared with 98,150 tons in 1885.

Albion.—The McGregor mine was not worked during the year, but it has been kept in order and ventilated. The slopes have been continued, and the levels extended. At the Foord pit a good deal of

pumping has been done and the water level lowered considerably. The pumping has been done in the main hoisting shaft by means of two self-filling and self-discharging iron tanks, raised by the winding engine. These tanks are 8 ft., 6 in., by 6 ft., 3 in., by 3 ft., and the engine makes 40 trips each hour. The amount of water thus raised during the year is given by Mr. Madden at 873,800 gals. per day of 22 hours, and at no less than 1,599,758 tons for the whole year. The output of the Colliery was 77,807 tons, compared with 129,195 tons during the preceding year.

Vale.—The explorations in the McBean seam at the 1800 feet level on the east side of the fault have shown good and regular coal, and it is proposed to open it out to the rise. The new 2,400 feet level is working regularly, and the coal continues of good quality. In the six feet seam the workings have been regularly extended and improvements effected in the ventilation. The output of the colliery was 128,539 tons, compared with 96,135 tons in 1885.

Intercolonial.—At this mine work has been confined to the main slopes, the No. 4 slope and the second seam shaft remaining unworked. There are few new points of interest in the operations conducted here. A steam jet has been introduced for the purpose of maintaining ventilation should any accident happen to the fan. The coal raised amounted to 108,498 tons, compared with 109,139 tons during the preceding year.

Messrs. Grant & Muir worked during part of the year on a small seam of coal at Coal Brook, on the Montreal and New Glasgow area, and in the fall removed to the east end of the East River area, where arrangements were made for opening one of the seams of the marsh group.

CAPE BRETON COUNTY.

The total sales from Cape Breton County during the year 1886, were 588,191 tons, compared with 517,975 tons during the year 1885 and 539,064 tons during 1884.

The home sales were 153,652 tons, against 151,371 tons in 1885.

New Brunswick took 26,284 tons, compared with 28,498 tons during the preceding year.

The sales to Newfoundland were 71,018 tons, against 69,833 tons during the year 1885.

Prince Edward Island took 14,201 tons, against 13,613 tons in the year previous.

The sales to Quebec show 254,328 tons, against 215,254 tons during the year 1885.

The sales to the West Indies amounted to 11,364 tons, compared with 5,618 tons during the preceding year.

The trade with the United States was 56,606 tons, compared with 33,788 tons in 1885, and 62,565 tons in 1884.

COLLIERIES.

Sydney—The seaward extension of the workings has been steadily continued. The Francklyn Lease lying under the harbor has been worked to some extent through this mine. The greater part of the water with which the fire of last spring was drowned out, has been removed. The cause of the fire has never been positively determined, but it has been suggested that it was caused by sparks from a lamp falling among some dry timber. Mr. Neville gives some further information about the arrangements made concerning this district of the mine. The output was 139,646 tons, compared with 124,274 tons in 1885.

Victoria—Work has been continued steadily at this mine. The fault on the east side which was a flat lying upthrow going east was pierced. The slopes are being extended, and the lower sections are dryer than those first opened. The output was 50,156 tons, compared with 47,614 tons in 1885.

Lingan—In the fall, work was discontinued in this mine, and the plant removed. The old port of Lingan, is not adapted to the present requirements of the coal trade, as it is too shallow for steamers and large sailing vessels. It is proposed to re-open the seam some distance to the north and to ship over the Low Point Railway. The output was 17,688 tons, against 21,761 tons in 1885.

Reserve.—Work was carried on steadily during the past season, the output being 81,783, compared with 82,276 tons during the preceding year. The slope to the Emery seam is about 250 yards long and dips at the rate of one foot in four. The Emery seam as cut by it is of good quality, and from 4 ft. 9 in. to 5 ft. in thickness. A stapple has been sunk between the seams and connections made for ventilation.

International—The output at this mine was 118,129 tons, against 67,959 tons in 1885. Workings have been continued in the upper level and some pillars drawn. The No. 4 landings have been continued, and the new deep workings opened out. An underground engine, friction geared, with two nine inch cylinders, geared three to one, has been set to haul along the upper level. A Riggs patent screen and tippler has been erected, and found to give every satisfaction.

Bridgeport—Mr. Mitchell continued working, and has completed an air shaft 40 ft deep, and a reservoir, and made further improvements above ground. The output was 14,344 tons, against 13,178 tons during the preceding year.

Little Glace Bay.—The working places have been extended during the summer on the system in force since the opening of the pit. A new boiler stack and foundations have been built, and the boilers removed to the rear of the winding engine. The output was 33,382 tons, compared with 39,400 tons in 1885.

Caledonia.—The deeps have been continued and fresh rooms won out, the greater part of last season's coal having been taken from them. The coal in this section is of excellent quality, but as a little gas is given off, caution is required in working. The output was 72,810, compared with 58,859 tons in 1885.

Ontario.—A little work was done in the upper portions of the mine, no attempt having been made to reach below the water level.

Block House.—No work of any moment was done here during 1886. In the summer the goods and chattels of the mine were seized by the sheriff and sold for arrears of royalty.

Gowrie.—The dip slants have been continued and are 300 yards in length, levels have been driven east and west and rooms turned away. The coal is of good quality, and from five to five and a half feet thick. The coal is raised to the pit bottom by a surface engine having a pair of 6 in. cylinders, electric signals being used. Work has been continued at the Briquette factory, and the fuel is steadily finding favor for steam and domestic purposes. The output was 93,307 tons, compared with 74,414 tons during the preceding year.

MISCELLANEOUS.

A few tons of coal were mined at Broad Cove and Chimney Corner in Inverness County.

A seam of coal said to be eight feet thick and of workable quality is said to have been found to the west of the Gowrie Leases at Cow Bay.

Discoveries of coal were reported from Onslow and Lower Stewiacke in Colchester County; from Oxford, and Advocate Harbor, Cumberland County; and Selma, in Hants County.

GOLD.

The returns show that 128,880 days' labor were performed, and that 29,010 tons of quartz were crushed, yielding 23,362 ounces, 5 dwts., an average of 16 dwts. per ton, the maximum yield being 17 oz., 10 dwts., per ton, and minimum 5 dwts.

The yield of gold is slightly larger than during the previous year, but the increase is smaller than it should be. Many of the older districts fell off largely in their production; notably Montague, Stormont, Uniacke; and the larger output of the "unproclaimed and other districts" little more than made up the deficiency.

DISTRICTS.

CARIBOU.—The returns for 1886 show 2,233 ounces, compared with 1,335 ounces in 1885. On the property of the Moose River Company a good deal of work was done by tributors on the Little North and Copper leads. Bruce did some prospecting on the Taylor and Archibald properties, working in the latter two small rich leads.

Mr. Touquoy worked several leads, among which may be mentioned the North, Little North, and Copper Lead. On the first, last year's operations were continued. The South lead was opened by him for about 60 feet, this vein forms a saddle dipping west. On the Copper lead a new shaft was sunk, and about 70 feet opened.

In Caribou, Mr. Bruce worked in Lease No. 79, on the North Lead No. 1 of Mr. Touquoy, and the Lake lead was worked by Mr. Wadsworth for some American capitalists. The lead passing abruptly across the metals for some distance, resumed its normal course, widening to several feet and yielding rich quartz.

DARR'S HILL.—The Dufferin Gold Mining Company has proved the most permanent of the gold mining corporations of the Province. During the past year the returns show that 11,628 tons of quartz yielded 6,509 ounces, being a total to date of 24,556 ounces from 44,881 tons of quartz. During the past season their works have been pushed to the east, the quartz measuring from four to twelve feet in thickness. A dam has been built across the river about one half mile above the crusher dam, and power obtained to do all the pumping, hoisting, etc., by an endless wire rope, connected with friction gear, etc., at each shaft.

FIFTEEN MILE STREAM.—Mr. Hudson has continued working his areas, but the resumption of work on the property generally known

as the Hall-Anderson did not take place. Mr. Grant and others did some prospecting, and Mr. Walton began to test some promising leads at Caledonia.

MONTAGUE.—Work on the Albion areas was stopped entirely in the spring, and the district was idle until the fall, when Mr. Hale reopened the main lead on the Symond's property to the east of the mill; the vein promises well, and work will be continued.

OLDHAM.—Mining business has revived to some extent in this district and is in a very encouraging condition. J. E. Hardman has been sinking and drifting on the "Dunbrack" lode and has obtained some rich quartz.

E. C. McDonnell has been working the property adjoining J. E. Hardman on the "Dunbrack" lode. The lode increased in value in depth, and the returns from the quartz in the bottom was 3 oz. per ton. Mr. McDonnell intends to move his engine, hoist and pump to the 310 feet shaft and push the work forward vigorously during the coming season.

Donaldson Bros., have been working a property on the same lode and are now down 95 ft. in the main shaft. The lode has improved in value, in depth. They propose to put up appliances to carry the shaft deeper during the coming season.

RENFREW.—In the spring some ground was worked by Mr. Hayward, and attention was turned to deepening the shaft, which is now 300 feet deep. A large amount of ore has been blocked out, and it is expected will occupy the mill for several months.

SHERBROOKE.—The total returns from this district were 1,341 oz. from 2,850 tons; the smallest being 63 ounces in May, and the highest 278 ounces in March. During the season Mr. Williams worked on the New York property, re-opening the Old German pit, the lead showing from 4 to 10 inches, at the shaft bottom 180 feet deep. Several leads were opened and tested on the Wellington area. On the Pactolus stopes were carried eastward from the great open cut into the Meridian property. Work was done by Messrs. Foley, May, and others at several points, but I regret to say that mining is still dull in Goldenville.

At Cochran's Hill a little work was done on the Cumminger property by Mr. Caffrey; and Mr. R. P. Fraser continued the development of the Crow's Nest mine, where several promising leads were worked, and low grade ground tested.

STORMONT.—Operations have been partially suspended in this district. Tribute work has been carried on by Mr. Hewitt and others at various points. At the Narrows of Country Harbor a good deal of prospecting has been done on Johnson's Brook. Several promising leads have been found, especially on the properties of the Messrs

Cook and of Mr. Morrison. The total yield of the district was 435 ounces from 429 tons of quartz. A fifteen stamp mill has been put up, road made, etc.

TANGIER.—The returns show 360 ounces from 936 tons of quartz, compared with 431 ounces from 874 tons in 1885. A little work was done on the Strawberry Hill property. Mr. Miller worked on the Leary Lead, and Mr. Murphy took out some ground in the west end of the Nugget lode workings. In Mooseland a little work was done by Mr. Irvine, and some prospecting carried on by Messrs. Townsend, Miller and Dissoway.

UNIACKE.—Little work of note was performed here during the past season. The returns show only 320 ounces.

WAVERLEY.—Mr. Huff continued working on the American Hill, the only systematic work performed in the district.

UNPROCLAIMED and other districts.

BEAVER DAM.—This mining camp has been revived and has received considerable attention during the season from prospectors. William Yeadon has a party of 12 men in camp developing his property. He has opened up 3 leads that he estimates will pay well to work. Having put up a crusher with one battery of four stamps to test the leads as they were opened, he is now preparing to place the second battery and push the work during the coming season. He has built a dwelling house, shaft houses, barn and blacksmith shop. The mill is run by water. Several other parties are prospecting properties here.

GOLD RIVER.—Prospectors have had their interest in this place revived and have paid considerable attention to the exploration of the part of the district lying east of the river. Several large leads have been found. Webster Eaton has been opening up the Mills property and is building a crusher at the mouth of the "Branch" brook. Work has also been done by Heisler and others.

WHITEBURN.—Mining operations and prospecting have been vigorously pushed during the season. Several new leads have been opened up. Two new mills have been put in operation, one on the Parker and Douglas Property, and the Foster mill on the Parker, Cole and Wile property. The works on the Parker and Douglas Company's property have all been put up during the season. The new lead discovered in September to the westward of McBride's hill turned out very rich looking quartz and a number of people bought interests in the Parker, Cole and Wile and Annand areas and put up the Foster mill. McGuire Bros. have opened another lead on their areas.

MALEGA BARRENS is a new district, the first gold being found in June. A very large number of areas were taken up by different parties to prospect on. The outcrops of several lodes shewing gold were found on several properties, and regular mining operations were

commenced on the properties of Wharton & Co. and McGuire and Smith. A road has been built in to the mining properties. This district lies about four miles easterly from Brookfield, Queens Co.

CARLTON, YARMOUTH Co., is a new district, gold being first discovered during the early spring of 1886. Messrs. Hale and Ross acquired the title to the property of Messrs. Crosby and Wyman, and prospected the areas. The outcrop of a good streak of gold was found in the summer and the work of sinking shafts and drifting was rapidly pushed. At Christmas the shafts were down about 100 feet, with about three hundred feet of drifts and about 50 tons of rich ore taken out. Hale and Ross mine is advantageously situated in the village of Carlton, Yarmouth County, and near to the large water power of the Tusket river that drives the saw mills in that place.

CHEZZETCOOK.—On the Oxford property, a small lead running under the battery, and from one-half to three inches thick, was opened in the fall and proved very rich.

At Rawdon the two mines have continued working steadily; and the district has become a large and steady producer. Some work has been done at Gold River, Killag, Leipsigate, Pleasant River, and reports of gold finds have been received from numerous points.

IRON MINING.

During the past season the Mines of the Steel Company of Canada at Londonderry have been steadily worked. The output was 44,388 tons of brown and white ores. There were also 947 tons of ankerite quarried for a flux, in addition to 13,729 tons of limestone from Mr. McDonald's quarry near Brookfield.

Discoveries of iron ore were reported from Grand Lake, Halifax Co., and from the Long Island District, Cape Breton Co. Here Mr. Greener opened the outcrop of two beds of red hematite of excellent quality up to ten feet in thickness. They are situated very favorably, being on the side of a high hill and only a few yards from deep water.

GYPSUM.

The exports for the year were 123,753 tons compared with 94,044 tons in 1885. Mr. Dimock shipped largely from his Windsor quarries, and 23,272 tons were extracted at Cheverie. The Messrs. McCurdy, at Baddeck, shipped about 4,000 tons from their quarries at St. Ann's Harbor.

ANTIMONY.

It is stated that American capitalists have purchased the Rawdon Mine from the local owners, and propose to largely increase its production. Last year 645 tons were shipped.

COPPER.

During the past season exploratory and preparatory work has been continued at the Coxheath Mines. The drifts on the various levels have shown new bodies of ore large in extent, and carrying good percentages of copper.

Mr. E. D. Peters, the well-known copper metallurgist, sums up the results of a trial on a practical scale of the Cape Breton (Coxheath) copper ores, iron ores, coke, and limestone as follows:—

1st.—That the ore can be smelted in a blast furnace producing a clean and fusible slag.

2nd.—That the Sydney Coal field produces an excellent coke that will smelt over seven times its weight.

3rd.—That the iron ore and limestone of the district furnish a cheap and excellent flux for the Coxheath.

4th.—That a light grade matte can be produced from the smelting of the raw ore with without any preliminary washing.

5th.—That taking into consideration the prices of fuel, flux, and labor, copper smelting can be done far more cheaply on Sydney Harbor than at any point in the United States.

From Mr. Peters' tests it appears that 13,450 tons of ore, averaging 52 per cent. of copper, being smelted with the necessary fluxes and coke at the rate of one ton of coke to seven of mixture, yielded a clean matte of the following composition:

Copper	37.2
Iron	28.6
Sulphur	33.4
Arsenic	00.0
Antimony	00.0
	<hr/>
	99.2

The slag contained under one-third of one per cent. of copper.

The discovery of lodes carrying sulphur ores with copper, and rich copper pyrites was reported from the Long Island district on properties owned by Messrs. Greener, Ingraham, and others, of North Sydney.

MANGANESE.

Mr. Stephens reports that about 200 tons were extracted at Tenny Cape.

At Onslow Messrs. Carter and Archibald took out about 20 tons in the spring, but did not work in the fall. The indications of ore are very extensive in this locality (East Onslow.) The ore hitherto mined has been found in small rounded pieces in the loamy clay and the underlying red sandstone. In the latter it also occurs in thin veins filling cleavage and shrinkage planes. The ore is extracted from open quarry faces, and after hand dressing is jigged and sorted. This ore has a shorter grain than that found at Tenny Cape, but is of excellent quality. Some ore was mined at Cheverie, Stewiacke, and Hantsport. From Wolfville there was exported 250 tons of mineral classed as "Manganese," but probably more correctly ranked as an ochre.

DEPUTY INSPECTORS' REPORTS.

DISTRICT OF PICTOU, COLCHESTER, AND CUMBERLAND.

WESTVILLE, N. S.,

31st December, 1886.

E. GILPIN, ESQ.,

Inspector of Mines.

DEAR SIR.—I take much pleasure in forwarding you the annual report of my inspection for the year ending December 31st, 1886.

SPRING HILL MINES.

In my inspection of these mines I learned that gas had been frequently found in the West slope, also in East side of East slope. The management strictly fulfilled the requirements of the law in such cases made and provided. On the eleven feet seam (underlying the South slope seam) to which particular reference was made in my last report, and on which a small shaft was sunk, a slope has now been driven down about one hundred and fifty feet, where a break has occurred, and at this point a bore hole was put down and passed through a six and one-half feet seam, which either overlies the eleven feet seam, or the eleven feet seam is only six and one-half feet thick on the west side of the break. As yet, however, that particular vicinity is not fully prospected, so that it would be premature to say whether this is the eleven feet seam, so-called, or another seam that overlies it.

I have visited this mine once every month during the year, and on each occasion took measurements of the air, and found it satisfactory. The tables annexed shew in all cases the quantity circulating at the discharge. The south slope on December, 18, 1885, was down 830 feet: at the time of my last visit it was 1800 feet deep, and the sinking still in progress. The management are at present putting up a small engine on the 1300 feet level, East Slope, which slope they intend sinking for another lift.

CHIGNECTO MINES.

During my inspection of this mine I found it in good working order, and the air satisfactory. There were however in December signs of fire on No. 4 bord of No. 3 balance, east side of mine, and the

management have taken every precaution to enable them to keep guard and watch over the fire, and prevent it from breaking out and spreading, by building it off with brick stoppings.

JOGGINS MINES

Were idle in January and February; in March I found them started to work. On my visit September 16th, gas had been reported in No. 2 bord, 3rd balance; attention was drawn to the law which was thus complied with. I learned in November that the West Level had been drawn to within 70 or 80 feet of a break, and in December the management had decided to let it stand at that point. The East level is going through a break on East side.

SCOTIA MINE.

On my visit in January I found eleven men at work, and that they had pierced up to the top seam, three feet thick. In February it was overflowed with freshet. A few men were working in March, and it was idle again in April. In July indications of fire appeared, which in August I saw was damped out, and since that time the mine has remained idle.

MINUDIE AND MILNER MINES.

Some little work was done in January and February, but on all my subsequent visits they were idle.

S. E. FREEMAN (OLD LAWSON MINE.)

Work has been going on in a little way at this mine during part of the year. In November they started to hoist coal, and in December were putting up an engine with a view to larger operations.

WM. PATRICK.

During January and March some little work had been done at this mine. It remained idle from that time until my visit on December 3rd, when the management were erecting an engine house at the old slope.

BOSTON MINING CO.'S MINE.

In March I found 9 or 10 men at work here. On April 27, and the subsequent portion of year, it was idle.

STYLES MINE.

I visited this mine on two occasions, and found very little work had been done. At my last visit it was idle, and about 30 tons of coal were lying on the bank.

VALE COLLIERY.

Gas to more or less extent has been given off in various portions of the McBean Mine during the year. In the inspection of working faces and air-ways I found the air satisfactory, but in any heads driven up-hill off the air, very strict precautions had to be used on account of the gas. The management have succeeded in driving through the "trouble" on the East side at the 1800 feet level, and extended their workings several hundred feet in the coal on East side of trouble, and have also laid rails down the slope from 1800 feet level to 2400 feet level, and are hoisting coal from that point. A perceptible increase in the volume of air will be noticed in the Greener Mine in October; the management having succeeded in getting their new air-way in operation, which with larger area, and less friction produces this satisfactory result. An engine has been placed at 1800 feet level to hoist from lower lift to 1800 feet level, and from thence it is taken by the main hoisting engine to the surface.

ACADIA COAL CO., WESTVILLE.

In the mine at each official visit I found the air-ways satisfactory, and the air kept up the working faces. They are taking out the pillars on the 2400 feet level successfully, and on the 3100 feet level extending levels on each side. Although a considerable amount of gas is evolved a sufficient circulation of air is kept up to working faces, and none is allowed to lie. The coal on lower left presents a fine appearance.

INTERCOLONIAL COAL COMPANY.

I visited this mine frequently during the year, and on one occasion two delegates, namely, John Johnson and Thomas Blackwood, appointed by the men, inspected along with me the workings of the mine, which were found satisfactory. During the summer a steam jet was placed in the up-cast shaft, and the fan stopped for several hours, during which time no men were allowed in the mine. The jet being applied restored the circulation to such a degree as indicated that in case of damage or injury to the fan the jet would keep the air to a certain extent circulating. The management have driven a place through the "dike" on the 800 feet lift, which will shorten the air return by some hundreds of yards. The Scott Pit and No. 4 slope have remained idle during the year.

HALIFAX COMPANY.

The McGregor Pit was idle during the year, except that in November a set of men were started to pierce through a balance and obtain a better exit for the air. Ventilation by the fan was kept up during the year, and the water was taken out.

Slopes Nos. 1 and 2. During the year these slopes have been sunk further down in the seam, and at the present time the management

are continuing their operations. No. 1 slope is now down a depth of about 1,400 feet, and No. 2 is down about 1,650 feet. At my visit in August I found the air at one point, viz.: top board on inside balance, No. 1 slope, not all that could be desired. I drew the attention of the management to this, and the defect was promptly attended to. On previous visits, and since that time, the air has been satisfactory.

Water is still being extracted from the Foord Pit by means of iron tanks, and is being lowered at the rate of about one foot per day.

JOHN MUIR & CO

Continued some small operations on the seam at Coal Brook; but during latter part of year suspended work there altogether, and leased the East River area, from B. G. Gray, Esq., Halifax, and moved their plant a few weeks ago to a small slope on said area, which slope was sunk about 100 feet; there is a seam of coal there about four feet thick, which has a good appearance.

During the month of October I visited the Acadian Iron Mines, travelled the workings, and found them well-aired. In August I visited 15 Mile Gold Stream. Travelled Hudson's mine, and the Anderson and Hall mine, and found them in good order. I attach tables giving numbers of serious accidents and causes thereof, volume of air circulating, also a tabulated statement of the various appliances used in discharging water from the mines, etc.

I am, Sir,
Yours very truly,

WILLIAM MADDEN, JR.,
Deputy Inspector of Mines.

DETAILS OF PUMPING APPLIANCES.

COMPANY.	Appliances.	Length of Stroke.	Diameter Cylinder.	Diameter Water Cylinder.	Number strokes per minute.	Steam pres- sure at Boiler.	Distance of pump from boiler in ft.	Steam pres- sure at pump.	Vertical height of Discharge.	Pressure of head per sq. in. lbs.	Length Steam Pipe.	Length Water Pipe.	Diameter Water Pipes.	Diameter Steam Pipes.	Average gallon dis- charge per day.	Tons of wa- ter raised, year 1886.	Tons of coal raised dur- ing year 1886.	REMARKS.
INTERCOLONIAL COAL COMPANY, Westville.	Camaron Pump. No. 8.	36 in.	18 in.	8 in.	20 to 40	lbs. 79½	480	lbs. 208	350	lbs. 208	800	.....	.....	5 in.	60,000	104,500	108,498	Pipes cover- ed with com- position made by Me- chanical En- gineer.
	No. 3.5.	12 "	10 "	4 "	40 to 60	80	1380	77½	300	130	900	900	3 × 2½	2 × 2½	.....	.....	.....
	No. 3.4.	12 "	7 "	3½ "	40 to 60	75	1780	75	113	49	400	400	2 in.	2 in.	.....	.....	.....
	Duplex Compound Pump.	24 "	H. P. 12 "	5½ "	45	50 lbs.	2600	40	996	433	2600	2100	.....	4 "	120,000 per day of 24 hrs.	219,000	98,891	Pipes cover- ed composi- tion clay & straw.
JOGGINS.	Burling and Johnston's Pump.	40 "	20 "	8½ "	15	60 "	1500	38	205	89	1500	600	8 "	4 "	84,000	153,300	22,243	Pipes not covered.
	Camaron Pump.	14 "	14 "	6 "	.....	75 "	600	50	385	167	600	600	3 "	4 "	21,000	43,800	9,148	Pipes not covered.
CHIGNECTO.	Camaron Pump.	24 "	15 "	5 "	50	80 "	1240	70	365	159	1240	1040	.....	.....	144,000	262,800	.....
	Blake Pump.	12 "	8 "	5 "	60	.....	510	.....	130	57	510	310	.....	.....	8,610	.....	.....
VALE COLLIERY.	Knowles.	30 "	30 "	8 "	25	70 "	1400	60	650	282	1400	1200	.....	6 "	234,000	.....	128,539	Pipes cover- ed to pit head. Bal- ance of pipes in mine ex- posed.
	Camaron.	30 "	20 "	6 "	50	.....	500	.....	238	103	500	500	.....	4 "	252,000	459,900	.....	Disch'rgs to mid. pump. Disch'rgs at surface. Used as a sparo pump.
	Matheson Pump.	24 "	18 "	6 "	.....	.....	.....	.....	420	183	900	800	.....	.....	.....	.....	.....
GREENER, or 6 ft. Seam.	McBean Seam. Connected.	Top. Mid. Bot.	30 "	8 "	25	70 "	1400	60	650	282	1400	1200	.....	6 "	234,000	.....	128,539	Pipes cover- ed to pit head. Bal- ance of pipes in mine ex- posed.
	McBean Seam. Connected.	Top. Mid. Bot.	30 "	8 "	25	70 "	1400	60	650	282	1400	1200	.....	6 "	234,000	.....	128,539	Pipes cover- ed to pit head. Bal- ance of pipes in mine ex- posed.

Accidents, Fatal and Serious, during year 1886.

No.	Date.	Mine.	Name.	Occupation.	Remarks.
1	Jan. 11...	Vale Colliery..	— Livingston ...	Boy	Leg injured. Jammed between two boxes.
2	Feb. 9....	Halifax Co....	James Ferguson ...	Trapper	Leg and arm broke; box running over him.
3	May 3 ...	Spring Hill ...	Murdoch McLeod ..	Miner	Killed by a fall of roof.
4	May 5 ...	Intercolonial ..	David Hayman	Boy	Box passed over him. Died 12th May.
5	May 19 ..	Vale	William Carroll....	Miner	Leg injured; coal falling on him.
6	Aug. 26 ..	Acadia	James McCoul.....	"	Burnt, whilst emptying his powder.
7	Sept. 3 ...	Intercolonial ..	David McPherson..	"	Leg broken; fall of face of pillar.
8	Nov. 1 ...	Spring Hill ...	George Turner.....	"	Fatal fall of top coal.
9	Nov. 3 ...	" "	Adam Lorimer	"	Leg bruised; came in contact with rope in slope.
10	Dec. 22..	" "	Isaac Conway	"	Burned slightly with gas.

Volume of Air in cubic feet per minute circulating in the Pictou and Cumberland Coal Mines during year 1886.

COMPANY.	MINE.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Mode of Ventilation.
Spring Hill Coal Company	N. Slope	37,900	39,100	39,200	41,000	45,600	58,000	38,000	52,000	45,500	42,100	43,300	42,500	2 Fans and Furnace Natural Ventilation. Furnace.
	W. "	31,600	28,000	39,000	34,020	33,600	32,400	41,000	35,300	29,400	32,000	32,600	32,400	
	E. "	42,800	41,100	41,900	36,600	35,200	34,500	23,200	31,500	28,600	33,200	35,200	36,200	
	S. "	12,800	13,000	11,300	11,200	11,120	10,900	10,800	10,200	11,000	11,500	12,100	13,500	
Chignecto Mine	Slope	24,000	17,000	23,500	22,300	21,500	20,800	20,200	21,200	22,500	23,200	23,000	25,700	Furnace.
Joggins	"	22,000	Idle.	22,500	21,200	22,300	25,200	24,200	Idle.	26,800	.....	24,200	26,300	Furnace.
Scotia	"	8,800	Idle.	Idle.	Idle.	Idle.	Idle.	Idle.	Idle.	Idle.	Idle.	Idle.	Idle.	Natural Ventilation.
Milner	"	5,000	4,200	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	Natural Ventilation.
Patrick	"	3,000	.....	2,200	.....	.....	.....	.....	.....	.....	.....	.....	.....	Natural Ventilation.
S. E. Freeman (Lawson Mine.)	Slope	3,200	Idle.	.....	Idle.	.....	.....	.....	.....	.....	.....	.....	.....	Natural Ventilation.
Intercolonial Coal Co., Westville	Slope	83,600	98,800	80,800	85,500	81,500	98,800	96,200	78,600	87,400	95,000	86,600	89,200	Exhaust Fan.
Acadia Coal Comp'y, Westville	Slope	65,000	Idle.	62,100	63,000	65,600	66,000	65,000	57,400	64,000	68,000	59,200	62,000	Exhaust Fan.
Halifax Company	No. 1 slope	30,000	27,700	27,700	27,700	22,000	16,500	17,000	17,300	25,400	27,500	20,500	32,900	Furnace.
Stellartown	No. 2 slope	21,000	25,200	22,100	21,000	Idle.	Idle.	Idle.	Idle.	18,700	23,800	24,500	26,200	Furnace.
	McGre- { w. side. gor Pit. { S side.	Idle.	Idle.	Idle.	Idle.	Idle.	Idle.	Idle.	Idle.	Idle.	Idle.	Idle.	Idle.	Exhaust Fan.
	McBean slope	45,700	46,500	60,000	50,000	42,000	42,000	44,000	47,500	47,000	40,000	40,600	41,000	Exhaust Fan.
Vale Company	Greener slope	21,700	46,500	21,600	32,400	34,000	34,600	34,400	30,600	28,000	55,700	Idle.	Idle.	Blower and down Fan.

CAPE BRETON.

BRIDGEPORT, January 5, 1887.

E. GILPIN, ESQ.,

Inspector of Mines:

DEAR SIR,—I beg leave to forward a report of my work as Deputy Inspector of Mines for the Island of Cape Breton, for the year ending December 31st, 1886.

SYDNEY MINES.

This mine I have visited twelve times during the year, and found it working in the usual systematic manner. On the south side, in the main entry, in several places part of the roof has been taken down for the purpose of making it safe and increasing the area of the air course. This is decidedly an improvement, and if more had been done it would be still better. On the north side a roadway has been driven about 70 chains through the pillars and old workings for the purpose of straightening and shortening the haulage in that direction. In March, 1885, when the north-eastern district was submerged for the purpose of putting out the fire, I learn from Mr. Brown, that the quantity of water let in was 74,000,000 gallons; out of that quantity there has been 26,000,000 gallons pumped out in the year 1885, and in 1886 there has been pumped 18,500,000 gallons, and there still remains to be pumped 29,500,000 gallons. The water is now under control and divided in two sections. The north section will probably be pumped out next season, and then attention will be directed to the east section. I understand that it is the intention of Mr. Brown to leave a strong barrier between this and the new works for the purpose of making a standage for water in case at any time leakage may take place in the iron tubing of the shaft. This would save the working parts of the pit and give ample time for repairs.

VICTORIA MINES.

This mine has been worked vigorously during the past year. I have made eleven official visits through it, and found the Mines Regulation Act observed. The ventilation is good on both sides of the slopes. On the east side there are four different splits, all returning separately to the upcast. A little gas began to show in the west levels last March, and as soon as it was brought to the notice of the agent he immediately put on shot-firers. The levels have been extended on both sides. A new pump has been placed at the bottom of the centre slope to replace the two referred to in previous reports. It is the same kind as at Lingan, and designed by Mr. Elliot, engineer of the Lingan Mines. Those pumps give good satisfaction. On the surface at the mine there has been put up a new reciprocating screen for the purpose of making nut coal.

BARRASOJS.

There has not been any work done here for the last seven months of the year.

LINGAN MINES.

I visited this mine ten times during 1886. It was kept working pretty steadily, but did not ship much coal. It is now closed down the rails and pumps have been taken out. It will likely fill with water to the upper level that runs to the sea shore. In travelling through this mine, I found that the pillars were strong and regular, and the timbering good. I must say that the ventilation was good through all parts of the mine.

OLD BRIDGEPORT.

I have visited this mine nine times. The headways mentioned in my last report have been driven and a shaft sunk to connect with one of them for the purpose of ventilation. The other, as was intended, has not been yet driven through the surface for a travelling road. The management says that it is the intention to drive this through next season, and build a furnace and cupola. This is much required, as I found on some of my visits in hot and calm weather, that the air was rather feeble at the face of some of the workings on the south side of the pit. The attention of the underground manager was drawn to a weak part of the roof on the south side, where the pillars were rather far apart, and he promised to secure it. In all other matters the requirements of the law are satisfied.

INTERNATIONAL.

I have visited this mine thirteen times during the past year. The dips have been driven to gain a new lift, where it is the intention to place thirty pairs of miners to work next season. A new Knowles pump is being placed there for the purpose of pumping the water to the upper level. A little gas has made an appearance at the face of the dips; it is the first of any account that has been seen at the mines. The ventilation is a little sluggish in some parts of the lower workings owing to the great distance from the furnace, and the large area it has to go through; however, it is well distributed and so far gives satisfaction. A new engine has been placed at the south side of the pit bottom for the purpose of drawing the coal to that point by means of a tail rope. I noticed at this mine, along the engine plane, that the corners of the refuge or man-holes have been whitewashed. I think this a very good idea, and if adopted in all the mines, would save some accidents, as the entrance can be seen at a greater distance. The cost is very small, a little lime and water answering the purpose, and where the pit is not damp, would remain bright a long time.

RESERVE MINE.

I made fourteen visits to this mine during the past year. The ventilation at this mine is about the same as 1885. On some of my inspections I found it a little thick in some of the boards, owing to so much powder being used there. The underground manager urged the men to fire in the afternoon, and this had a better effect. I may also add that he has used his endeavors to satisfactorily ventilate the faces of the different districts. Mr. Routledge has informed me that it is his intention, this winter, to build a new and higher cupola in place of the present one. Also, that he intends driving to the dip from the east slope to gain a new lift. The coal mined here this season was chiefly taken from the French, or east slope, and a portion which was taken out of south slant of east slope. A few pillars were taken out of No. 4 north landing on main slope. Last winter a shaft was sunk from the Reserve to the Emery seam for the purpose of ventilating the Emery Works.

CALEDONIA.

This mine was inspected by me eleven times. I found this mine in good condition. The slants were driven 300 feet further to the dip and a new lift gained, levels extended east and west, and boards broken off them. This section of the mine showed a good deal of gas, but great care and good ventilation render it harmless. A large portion of the coal shipped was taken from the dip slants, some from the pillars to the rise on the east side, and the remainder from the west side. The roof coal has been taken down where it was tender along the main road on east side, and new booms and timber put up there in order to make it safe.

LITTLE GLACE BAY.

I inspected this mine nine times during the past year. The work was not brisk the past season. I found the works carried on in a very satisfactory condition. The air much better than in 1885. It has been checked and sent closer to the face of the boards. There has also been a great deal of timbering done and stone blocking built up along the main roads for the purpose of safety. The roof in this part of the mine is very bad and requires great attention, especially as the works extend towards the rise. The boiler shed has been completed on the surface and three more boilers placed therein, making a total of six boilers. This is one of the best boiler sheds in this County, being built of an excellent quality of sand stone, quarried below high water mark on the sea shore.

ONTARIO.

This colliery was visited by me nine times. On my visit in June I found the air very thick at the face of the workings, and on examination found the cause to be that the air-way that was below the level was being closed up by the water raising from the dip. I

suggested that the door be taken down in the level or horse road, and stop the front of the rooms, and put up doors at intervals to admit the coal to come out. As soon as practicable this was attended to and the air allowed to go in to the face of the levels and return through the rooms to the furnace. This gave better satisfaction. The coal raised from this mine was all mined above this level on the south side of the slope. The timbering in the boards was fairly satisfactory. A great number of the props and booms in the slope had to be replaced owing to decay, a little more timbering would not be amiss in order to make it safe.

BLOCK HOUSE.

About the 24th of March the roof broke away below the brook, and the pit would have been drowned out, but for the energy of the officials and workmen. The opening was stopped, and made tight by them, and the pit saved. In the first of the season a small quantity of coal was shipped. About the 20th of August the plant was sold. In the later part of the season a few more cargoes of coal was shipped. In all I visited this colliery thirty times, chiefly for the purpose of looking after the extraction of the plant which was removed and stored satisfactorily. The works are now filling up with water, and in a very short time will be filled to tide level.

GOWRIE.

I visited this colliery fourteen times. In all my inspections at this mine I found the mines regulation act strictly fulfilled. The timbering all through the mine is kept in the best condition. The air is good. What chiefly adds to its purity is that very little powder is used in blasting the coal. The quantity of air has been considerably increased by a new and separate inlet through the east levels to the dip workings. The roads and ropes are in good condition and everything appears to work well. A large quantity of the coal shipped was taken from the new lift in the dip workings. The roof stone is much harder than to the rise, and the splint above the coal is very much thinner. The manager says the coal has improved in its quality.

CHIMNEY CORNER.

I paid an official visit to this mine on the 15th of July. I was informed that the work had started there on a small scale on the 2nd of May, and from that date until the date of my visit they had shipped three small cargoes. A vessel was being loaded while I was there, and five miners were at work. I did not consider one or two places in the main entry safe, owing to a great pressure on the timbers, which were on the point of breaking, this I brought to the notice of a man named Kenneth McIntosh, who was in charge, he promised to have it attended to at once and secured. A new outlet was driven for ventilation from the face of the outside board to the surface, and crop of coal. There is no furnace at this mine.

The air was very dull when measured, owing to the day being very calm and hot, 500 feet is all the anemometer showed. I did not see Mr. Evans the proprietor of the mines. I was informed that he had gone to England.

I also visited Broad Cove on the 15th of July. At the mine there has not been anything done for a number of years. The timbering in levels and mouth of slope were decayed, and a part of the roof has fallen in. There was a small opening in the side of the bank towards the crops of the coal, where some had lately been taken out for home consumption. Mr. Hugh Ross, who had taken charge of the place, was in Halifax during my visit.

I also beg to enclose tables showing amounts of air measured on my visits, accidents and cause, pumps etc. In conclusion I must say that the Mines Regulation Act has been very fairly observed through the mines here.

I remain your obedient servant,

PATRICK NEVILLE,

Deputy Inspector of Mines.

Report of No. of cubic feet of Air measured in Mines in Cape Breton year, 1886.

COLLIERIES.	January.	Feb.	March.	April.	May.	June.	July.	August.	Sept.	October.	Nov.	Dec.
Sydney Mines.....	.....	53,500	50,540	56,590	57,180	59,800	60,000	53,680	67,920	68,140	68,810	64,140
Victoria.....	30,700	25,600	22,200	30,600	31,000	.....	22,260	22,260	29,230	30,080	26,460	26,460
Barrasois.....	4,200	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Lingan.....	.....	.....	27,500	27,900	27,000	23,000	24,700	24,000	24,350	25,000	.....	.....
Old Bridgeport.....	.....	3,800	3,000	2,000	3,000	2,000	2,800	.....	3,500	7,700	9,550	14,800
International.....	10,000	10,000	15,000	24,000	29,400	36,400	32,000	40,240	35,940	40,380	10,500	.....
Reserve.....	20,000	15,000	20,000	28,680	31,000	20,760	26,460	30,180	27,150	26,700	33,000	20,000
Caledonia.....	.....	10,000	12,000	33,000	36,540	35,000	36,140	38,580	38,720	37,560	37,600	32,000
Little Glace Bay.....	9,800	.....	.....	15,500	21,150	20,200	15,000	20,000	18,720	.....	23,590	20,000
Ontario.....	.....	.....	.....	.....	6,000	4,550	4,700	5,000	4,000	6,000	5,000	14,800
Block House.....	.....	.....	15,000	18,000	20,000	.....	.....	10,000	.....	10,000	9,500	4,500
Gowrie.....	.....	13,000	20,000	25,000	40,000	40,000	39,500	41,500	32,460	38,000	42,000	46,660
Chimney Corner.....	.....	.....	.....	.....	.....	.....	500	.....	.....	.....	.....	.....

Report of Accidents in Mines in Cape Breton for the year 1886.

Date.	Name of Mine.	Name.	Occupation.	Remarks.
Feb. 23 ...	Sydney Mines.	John McNeil.....	Miner.....	Burned by powder explosion from can while loading.
"	"	Michael McNeil....	"	" " " "
March 5...	Victoria	Michael Gardiner..	"	Slightly burned from gas.
" 18...	Sydney Mines.	Alex. Corwill.....	Overman.	"
" 29...	Gowrie	Chas. Carmichael..	Machinist.	Arm broken by fall from scaffolding at pit head on surface.
April 17...	International..	Edmund Gcuthow..	Miner.....	Ankle bone broken by piece of coal rolling from junk on him.
May 8....	Little Glace Bay	Rodk. McDonald...	Driver ...	Bone broken in wrist between two tubs.
" 10....	Reserve	Thomas Henessy ..	Miner.....	Arm broken by fall of coal from face. Arm amputated.
" 11....	Sydney Mines.	George Kay.....	Overman.	Ribs broken between tubs on incline plane.
" 17....	Reserve	John Corbett.....	Miner.....	Leg broken by fall of coal from roof.
" 20....	Gowrie	Malcom McKinnon.	"	Ribs broken by fall of coal from face.
" 21....	"	Neil Lamond.....	"	Leg broken by fall of stone pot from roof.
"	"	Daniel McKeagan..	"	Body bruised by " "
" 31....	Sydney Mines.	Matthew Corkery..	Labourer.	Burned slightly by gas from roof.
"	"	Alex. McGowen....	Miner.....	Dropped dead at face of his board from heart disease.
July 11 ...	Caledonia.....	Charles McGregor..	"	Bruised from fall of coal from roof.
Oct. 19....	Sydney Mines.	Daniel Morrisson ..	Screen Boy	Killed by rope breaking; tub running back on him.

Figures relating to Machinery used in freeing Cape Breton Mines from Water during the year 1886.

COLLIERIES.	Number of Pumps.	Name and Style of Pump.	Steam Cylindr diam. inch.	Water Plunger diam. inch.	Length of Stroke.	Strokes per Minute.	Length of water-pipe.	Length of steam-pipe.	Steam pressure at Bank.	Steam pressure at pump.	Vertical Lift.	Gallons water per day.	Tons water per hour.	Tons of Coal raised during 1886.	REMARKS.
Sydney Mines (Queen) ..	1	Made to order.	30	8	48 in.	17	360 ft.	430 ft.	27 lbs.	.....	360 ft.	172,620	261,278	139,646	
do. (New Winn'gs	2	do.	62	20	84 "	4 1/2	720 "	.....	40 "	.....	720 "	139,863	227,901	50,156	
Victoria	1	Elliot.	18	7	44 "	14	590 "	890 "	40 "	37 lbs.	305 "	142,380	232,003		
Lingan	3	do.	18	7	48 "	22	350 "	1340 "	30 "	26 "	80 "			17,688	
do. ....	.....	do.	15	5	18 "	50	530 "	2048 "	30 "	24 "	116 "	80,124	131,056		
do. (Driven by frict'n)	.....	Made to order.	.....	3	9 "	.....	700 "	.....	.....	.....	150 "	.....	.....
International	2	Cameron.	16	6	30 "	30	.....	1905 "	45 "	20 "	.....	.....	.....	118,129	
do. ....	.....	do.	12	5	12 "	60	3547 "	1592 "	45 "	20 "	185 "	64,000	117,885		
Reserve	2	do.	12	7	24 "	60	.....	2080 "	50 "	35 "	.....	115,984	334,000	81,783	
do. ....	.....	do.	14	9	18 "	50	3037 "	1486 "	50 "	35 "	283 "	12,450			
Caledonia (two sets) ..	2	Lifting.	.....	8	48 "	12	123 "	.....	30 "	.....	123 "	86,400	170,785	72,810	
do. ....	.....	do.	.....	8	48 "	12	60 "	.....	30 "	.....	60 "				
Little Glace Bay	3	Cameron.	8	8	30 "	40	310 "	340 "	.....	.....	260 "	205,834	334,678	33,382	
do. ....	.....	Lifting.	6	6	48 "	10	255 "	.....	.....	.....	255 "				
do. ....	.....	do.	6	6	48 "	10	255 "	.....	.....	.....	255 "				
Block House	3	Knowles.	18	9	24 "	50	.....	.....	.....	.....	.....	648,720	268,457	5,053	For 5 ms. of year.
do. ....	.....	Built to order.	12	7	12 "	58	.....	.....	.....	.....	.....	139,984			
do. ....	.....	do.	12	7	12 "	58	1155 "	1700 "	.....	.....	115 "	139,984			
Gowrie	3	Knowles spec'l	20	10	48 "	20	254 "	244 "	43 "	35 "	215 "	328,265	535,252	95,307	
do. Lifting .....	.....	Built to order.	.....	10	36 "	36	110 "	.....	.....	.....	110 "				
do. ....	.....	do.	.....	10	36 "	36	110 "	.....	.....	.....	110 "				

LIST OF MINERAL LEASES (OTHER THAN GOLD).

No.	Lessee.	District.	Area, Sq. Miles.
COPPER.			
ANTIGONISH COUNTY.			
2	Ross, McKay, and others.....	.....	1
COLCHESTER COUNTY.			
	Moir, Wm. C., et al	Tatamagouche	10½
CAPE BRETON COUNTY.			
105	Burchell, J. E. ....	.....	1
106	Burchell, G. L., and others .....	.....	1
95	Coxheath Mining Co. ....	.....	1
104	McKenzie, H. R., et al. ....	.....	1
94	McKenzie & McKim .....	.....	1
HALIFAX COUNTY.			
1	McClure, Chas. F.	Gay's River.....	1
IRON.			
PICTOU COUNTY.			
43	Hudson, James.	East River.....	1
44	Hudson, James.	" "	1

Total area under lease 19½ square miles.

LIST OF MINERAL LEASES (OTHER THAN GOLD).—Continued.

No.	Lessee.	District.	Area, Sq. Miles.
	IRON.—(CONTINUED).		
	CAPE BRETON COUNTY.		
86	Brookman, S., et al	N. Side East Bay	1
91	Brookman, S. L	East Bay	1
93	Brookman, S., et al	" "	1
102	C. L. Ingram	" "	1
103	A. McKenzie, et al	" "	1
92	Matheson, D., et al	" "	1
84	Protheroe, Pryse	Cow Bay	1
	INVERNESS COUNTY.		
16	Inverness C. I. & R. Co	Whycocomagh	1
Total area under lease			27½ square miles.

LIST OF COAL LEASES—(CONTINUED.)

No.	Lessee.	Colliery.	Area Sq. Miles.	Working.	Agent and Manager.	Postal Address.
8, 9	Halifax Coal & Iron Co...	Ontario	1½	Working.	<i>Jno. Sutherland</i>	Pt. Caledonia.
27	General Mining Association	Bridgeport	2	Working.	{ <i>Rich. H. Brown</i>	Sydney Mines
	" " (sea area) ..	Sydney	18	Working.	{ <i>Cunard & Morrow</i>	Halifax.
	" " (sea area) ..	"	4		{ <i>H. Mitchell</i>	Bridgeport.
38, 39	Low Point, Barasois, and...	Lingan	13	Working	<i>Donald Lynk</i>	Low Point.
10, 21	Lingan Mining Co. (Ltd.) ..	"	9			
	Gibson, John, et al.	"	2			
4, 12, 16	Glace Bay Mining Co.	Glace Bay	3	Working.	{ <i>E. P. Archbold</i>	Halifax.
6, 13, 18, 19	International Coal Co., Lt'd.	International	4	"	{ <i>Chas. Rigby</i>	Lt. Glace Bay.
66	Merchants' Bank of Canada	Gardener	2		<i>P. Johnstone</i>	Bridgeport.
52, 53	McLeod, Hugh	"	2			
40, 41, 42	Ross, H. E., et al.	"	3			
79	Ross, W. J., et al (sea area)	"	1			
32	Sword, Wm. (sea area)	"	3			
23, 25, 70	Sydney & Louisburg Coal	Schooner Pond ..	10	Working.	{ <i>F. C. Kimber</i> ..	Sydney.
14, 24	and R. R. Co., Lt'd.	Reserve				
49	" " " " ..	Lorway				
64, 65, 68	" " " " ..	Emery				
69	" " " " ..	"				
54 to 63	Sydney C. M. Co. (sea areas)	"	10			
67	Weatherbe & Kirby	"	1			
78	Weatherbe, R. L. (sea area)	"	5			
96, 97, 98, 99, 100	Low Point, Barasois and	"			{ <i>W. Routledge</i> ..	Reserve Mines

Lingan Mining Co., Lt'd. " (sea areas)	.....	.....	Working.	D. Lynk	Low Point.
			5		
			2		
			<u>178½</u>		
		INVERNESS CO.			
8 Evans, Thomas		Chimney Corner.	1	T. Evans.....	Chimney Cor.
9 Evans, Thomas (sea area).		.....	1		
7, 12 Inverness C. I. & R. C. ....		.....	2	Alex. Wright....	Moncton.
13 McGregor, J. D.		Port Hood	3		
4 Richey, M. H., et al .....		.....	1		
11 Ross, W. J.		Broad Cove	1		
6 Ross, H. E., et al (sea area)		.....	1		
14, 15 Smyth, Peter .....		.....	2		
10 Tremaine, E. D. (sea area).		.....	1		
			<u>13</u>		
		VICTORIA CO.			
2 Kenny, T. E.		New Campbellton	3		
3, 4, 5 Ross, William		Black Rock	5		
			<u>8</u>		
Total area under lease.....			224 square miles.		

TABLE A.—COAL TRADE BY COUNTIES.

	CUMBERLAND.		PICOU.		CAPE BRETON.		OTHER COUNTIES.		TOTAL.	
	Raised.	Sold.	Raised.	Sold.	Raised.	Sold.	Raised.	Sold.	Raised.	Sold.
1st Quarter	92,557	86,006	71,504	60,298	43,694	6,567	195	183	207,950	153,054
2nd Quarter	100,369	94,938	110,384	92,822	194,880	168,580	.....	.....	405,633	356,340
3rd Quarter	123,178	111,536	130,099	123,519	281,761	292,599	.....	.....	535,038	527,654
4th Quarter	132,517	123,786	102,818	92,387	118,655	120,445	.....	.....	353,990	336,618
Total	448,621	416,266	414,805	369,026	638,990	588,191	195	183	1,502,611	1,373,666
1885	368,923	340,535	432,819	396,000	548,478	517,975	.....	.....	1,350,220	1,254,510
1884	279,964	258,405	511,193	464,181	598,156	539,064	.....	.....	1,389,295	1,261,650
1883	247,861	222,347	505,626	461,809	668,293	612,614	753	753	1,422,553	1,297,523

TABLE B.—COAL TRADE BY COUNTIES.

	CUMBERLAND.			PICOU.			CAPE BRETON.			Other Counties.			TOTALS.			Grand Total.
	Round.	Slack.	Run of Mine.	Round.	Slack.	Run of Mine.	Round.	Slack.	Run of Mine.	Round.	Slack.	Run of Mine.	Round.	Slack.	Run of Mine.	
Nova Scotia Land Sales	27,695	50,176	24,682	95,368	64,625	....	3,354	5,300	....	183	....	....	126,600	120,101	24,683	271,384
Sea borne.....	427	869	36	35,688	6,835	....	123,481	12,360	9,157	....	....	....	159,596	20,064	9,193	188,853
Nova Scotia, total	28,122	51,045	24,719	131,056	71,460	....	126,835	17,660	9,157	183	....	....	286,196	140,165	33,876	460,237
New Brunswick	27,458	23,232	67,398	28,463	3,083	....	25,909	230	145	....	....	....	81,830	26,545	67,543	175,918
Newfoundland .....	.....	.....	.....	458	.....	....	69,418	1,600	....	....	....	....	69,876	1,600	....	71,476
P. E. Island .....	.....	.....	.....	13,649	21,318	....	8,886	5,315	....	....	....	....	22,535	26,633	.....	49,168
Quebec.....	9,501	16,575	162,859	92,600	2,899	....	187,911	28,413	38,004	....	....	....	290,012	47,887	200,863	538,762
West Indies	5,021	336	.....	.....	.....	....	10,691	673	....	....	....	....	15,712	1,009	.....	16,721
United States .....	.....	.....	.....	2,160	1,880	....	19,967	23,599	3,040	....	....	....	22,127	35,479	3,040	60,646
Other Countries .....	.....	.....	.....	.....	.....	....	718	20	....	....	....	....	718	20	.....	738
Total.....	70,102	91,188	254,976	268,386	100,640	....	450,335	87,510	50,346	183	....	....	789,006	279,338	305,322	1,373,666
1885.....	81,390	80,901	178,244	289,909	103,960	2131	407,079	62,815	48,081	....	....	....	778,378	247,676	228,456	1,254,510
1884.....	155,999	102,406	.....	330,309	133,872	....	459,210	70,845	.....	....	....	....	945,518	316,132	.....	1,261,650
1883.....	152,453	69,894	.....	319,859	141,950	.....	543,419	69,195	.....	687	66	....	1,016,418	281,105	.....	1,297,523

COAL—SALES.

Markets.	1st Quarter.	2nd Quarter.	3rd Quarter.	4th Quarter.	Year 1886.	Year 1885.
Nova Scotia.						
Land Sales..	64,084	64,928	63,743	78,629	271,384	255,808
Sea borne...	5,014	38,405	84,231	61,203	188,853	188,844
N. S.—Total ..	69,098	103,333	147,974	139,832	460,237	454,652
N. Brunswick .	30,573	34,869	57,426	53,050	175,918	148,634
Newfoundland.	1,223	12,615	35,780	21,858	71,476	74,322
P. E. Island ...	.....	10,094	23,737	15,337	49,168	52,770
Quebec.	51,288	140,678	242,422	95,374	538,762	493,917
West Indies ..	410	6,778	1,177	2,999	11,364	5,732
United States .	.....	38,697	19,138	8,168	66,003	34,483
Other countries	462	276	.....	.....	738	.....
Total....	153,054	356,340	527,654	336,618	1,373,666	1,254,510
1885..	125,351	309,513	510,787	308,859	1,254,510	
1884..	138,303	307,915	486,601	328,821	1,261,650	

COAL.—GENEALRL STATEMENT.

1886.	Produce.	Sales.	Colliery Consumption.
1st Quarter..... tons	207,950	153,054	37,272
2nd "	405,633	356,340	35,651
3rd "	535,038	527,654	32,725
4th "	353,990	336,618	36,773
Total.....	1,502,611	1,373,666	142,421
1885	1,352,205	1,254,510	127,624
1884	1,389,295	1,261,650	116,769
1883	1,422,553	1,297,523	111,949

COAL PRODUCE OF NOVA SCOTIA DURING THE YEAR ENDED DECEMBER 31ST, 1886.

COLLIERIES.	SEAMS.	Produce.	SALES.				COLLIERY CONSUMPTION.			
			Round.	Slack.	Run of Mine	Total.	Per Cent.	Engines.	Workmen.	Per Cent.
CUMBERLAND CO.	North	9,148	5,292	1,435	800	7,527	82	1,402	195	17
	Joggins	22,243	15,666	3,131	.....	18,797	80	2,313	584	13
	Lawrence	50	.....	.....	.....	.....	.....	.....	.....	.....
	Spring Hill	416,769	48,750	86,550	254,176	389,476	93	17,178	4,376	5
	Scotia	411	394	72	.....	466	.....	.....	5	.....
	Pictou Co.	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Acadia	98,891	56,139	36,393	.....	92,532	94	4,863	1,950	7
	Third and McGregor	77,807	38,088	22,408	.....	60,496	77	13,895	3,400	22
	McBean and Six Feet	128,539	98,977	27,802	.....	121,779	94	5,797	2,333	17
	Acadia	108,498	79,702	13,907	.....	93,609	87	17,533	1,516	6
	Intercolonial .....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	New Glasgow	1,070	480	130	.....	610	.....	240	125	.....
	CAPE BRETON CO.	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Barasois	87	94	.....	.....	94	.....	.....	24	.....
	Blockhouse	5,063	2,913	.....	.....	2,913	.....	1,267	983	.....
	Bridgeport	14,344	11,189	1,330	.....	12,519	87	230	287	3
	Caledonia	72,810	49,404	23,644	.....	73,048	100	1,236	1,091	3
	Franklyn	1,996	1,530	466	.....	1,996	100	.....	.....	.....
	Glance Bay	33,382	26,588	2,535	.....	29,123	87	3,123	922	12
Gowrie	95,307	71,171	17,774	.....	88,945	92	3,160	3,410	6	
International	118,129	58,393	9,752	38,004	106,149	90	6,776	2,067	6	
Lingan	17,688	12,365	2,548	145	15,058	85	2,076	1,100	12	
Ontario	8,599	8,111	140	.....	8,251	99	180	168	.....
Reserve	81,783	67,550	15,852	.....	83,402	100	4,156	4,068	10	
Sydney	139,646	110,416	9,533	.....	119,949	85	15,947	7,391	11	
Victoria	50,156	30,611	3,936	12,197	46,744	93	3,563	1,491	10	
INVERNESS CO.	.....	.....	.....	.....	.....	.....	.....	.....	.....
Broad Cove	105	100	.....	.....	100	.....	.....	.....	.....
Ross	90	83	.....	.....	83	.....	.....	.....	.....
Total	1,502,611	789,006	279,338	305,322	1,373,666	.....	104,935	37,486	.....

COLLIERY CONSTRUCTION ACCOUNT.—1886.

COLLIERIES.	Shafts.	Slopes.	Adits.	Machinery	Colliery Buildings.	Dwellings.	Surface Works.	Railways.	Wharves.	Prospecting.	Total.
CUMBERLAND COUNTY.											
Chignecto
Joggins	\$ 150 00	.....	.....	.....	.....	.....	.....	.....	\$ 150 00
Lawrence
Springhill	\$ 831 00	.....	\$5616 00	\$2650 00	.....	\$375 00	.....	.....	\$1827 00	11299 00
Scotia
PICTOU COUNTY.											
{ Acadia											
Acadia Co. { Albion
{ Vale
Intercolonial	1388 00	316 00	181 00	.....	.....	\$ 91 00	.....	.....	1976 00
New Glasgow	5000 00	5000 00
CAPE BRETON COUNTY.											
Barrasois	332 00	.....	.....	.....	.....	.....	.....	.....	.....	332 00
Blockhouse
Bridgeport	\$ 200 00	.....	400 00	.....	.....	.....	.....	125 00	.....	.....	725 00
Caledonia	2176 00	554 00	.....	.....	.....	.....	.....	.....	.....	2730 00
Franklyn
Glace Bay
Gowrie	1558 00	.....	.....	\$296 00	.....	.....	.....	.....	1854 00
International
Lingan	417 00	.....	.....	.....	.....	.....	.....	.....	417 00
Ontario	81 00	10 00	.....	.....	.....	.....	.....	.....	91 00
Reserve	\$2052 00	1912 00	1545 00	.....	140 00	55 00	.....	.....	.....	.....	5704 00
Sydney	1107 00	.....	.....	.....	.....	.....	.....	1107 07
Victoria	4440 00	1827 00	185 00	.....	312 00	486 00	.....	.....	7250 00
INVERNESS COUNTY.											
Broad Cove	20 00	106 00	.....	.....	.....	24 00	.....	.....	.....	150 00
Ross
	\$2252 00	\$5271 00	\$10639 00	\$8876 00	\$3156 00	\$351 00	\$711 00	\$702 00	\$6827 00	\$38785 00

MINES REPORT.

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COLLIERIES.	UNDERGROUND.				ABOVE GROUND.				CONSTRUCTION.			TOTAL.		Average num-ber of tons per cutter.	Average quan-ity raised per day.	HORSES.		PITS WORKED
	Skilled Laborers.	Boys.	Days' Labor.	Skilled Laborers.	Boys.	Days' Labor.	Skilled Labor.	Boys.	Days' Labor.	Persons.	Days' Labor.					Above.	Below.	
CUMBERLAND Co.																		
Chignecto	11	3	4,308	2	5	2,311	...	...	...	...	...	25	6,619	831	42	1	1	218
Joggins	29	4	8,497	6	20	7,635	...	...	...	...	...	73	16,132	767	127	4	2	175
Lawrence .....	...	...	...	...	...	...	3	1	60	4	60	...	...	...	...	...	...	...
Springhill	412	237	199,755	66	129	53,028	14	9	4,747	1,005	257,530	...	...	1,011	1,653	10	45	252
Scotia	7	...	255	1	...	53	...	...	...	8	308	...	...	...	...	1	...	53
PICTON Co.																		
Acadia Co.—Acadia.	91	28	45,272	18	40	17,186	...	...	...	280	62,458	...	...	1,085	497	8	5	199
“ Albion.	105	37	42,191	55	59	34,766	...	...	...	345	76,957	...	...	741	347	14	6	224
“ Vale ..	203	109	76,377	35	67	27,928	...	...	...	444	104,300	...	...	633	756	4	10	169
Intercolonial	128	50	49,625	33	50	24,459	1	...	177	325	74,261	...	...	847	448	8	17	242
New Glasgow	4	1	1,590	2	...	452	...	...	...	7	2,042	...	...	250	...	...	...	180
CAPE BRETON Co.																		
Barrasois .....	...	3	207	...	2	138	...	...	...	5	345	...	...	...	...	...	...	38
Blockhouse	16	1	2,356	5	10	3,714	...	...	...	40	6,070	...	...	316	...	3	3	70
Bridgeport	14	2	3,568	2	1	1,662	1	...	129	24	5,359	...	...	1,024	135	1	2	106
Caledonia	82	6	19,203	15	22	10,817	10	1	2,245	188	32,265	...	...	900	428	5	15	170
Francklyn	4	1	974	1	1	507	...	...	...	8	1,481	...	...	499	...	...	...	...
Glace Bay	61	6	8,158	27	19	12,535	...	...	...	129	20,693	...	...	547	236	6	14	141
Gowrie	119	13	28,600	41	58	22,096	1	...	75	292	50,771	...	...	800	700	9	18	135
International	150	31	16,353	31	47	7,088	...	...	...	305	23,421	...	...	787	722	6	34	162
Lingan	49	6	9,778	3	21	5,440	...	...	...	100	15,218	...	...	400	114	4	7	155
Ontario	15	2	3,398	3	8	2,461	...	...	...	35	5,859	...	...	570	74	3	3	114
Reserve	137	15	34,874	16	18	9,865	4	1	1,100	240	45,839	...	...	599	467	6	15	175
Sydney	213	37	67,992	56	80	45,037	4	...	1,100	522	114,129	...	...	650	723	11	40	193
Victoria	86	20	31,325	5	34	14,533	...	...	...	163	45,858	...	...	583	170	3	3	296
INVERNESS Co.																		
Broad Cove	5	3	...	2	...	9	...	...	...	10	104	...	...	...	...	1	...	...
Ross	3	1	60	1	...	30	...	...	...	8	90	...	...	...	...	1	...	30
	1944	615	654,811	426	691	176,303,725	38	12	9,633	4,585	968,769	...	...	...	...	...	...	...

COAL.

NOVA SCOTIA EXPORTED TO THE UNITED STATES.

Years.	Tons.	Duty.	Years.	Tons.	Duty.
1850	118,173	24 ad.	1869	257,485	\$1 25
1851	116,274	"	1870	168,180	"
1852	87,542	"	1871	165,431	"
1853	120,764	"	1872	154,092	75
1854	139,125	Free	1873	264,760	"
1855	103,222	"	1874	138,335	"
1856	126,152	"	1875	89,746	"
1857	123,335	"	1876	71,634	"
1858	186,743	"	1877	118,216	"
1859	122,720	"	1878	88,495	"
1860	149,289	"	1879	51,641	"
1861	204,457	"	1880	123,423	"
1862	192,612	"	1881	113,728	"
1863	282,775	"	1882	99,302	"
1864	347,594	"	1883	102,755	"
1865	465,194	"	1884	64,515	"
1866	404,252	"	1885	34,483	"
1867	338,492	\$1 25	1886	60,646	"
1868	228,132	"			

NOTE.—The quantities given for the years 1850 to 1872 are on the authority of the Board of Trade, Philadelphia, and are probably under-estimated.

Nova Scotia Coal Sales, from 1785 to 1886 (inclusive.)

Year.	Sales.	Total.	Year.	Sales.	Total.	
1785	1,668	14,349	1841	148,298	Forw'd 1,208,177	
1786	2,000		1842	129,708		
1787	10,681		1843	105,161		
1788			1844	108,482		
1789			1845	150,674		
1790			1846	147,506		
1791	2,670		1847	201,650		
1792	2,143		1848	187,643		
1793	1,926		1849	174,592		
1794	4,405		1850	180,084		
1795	5,320	51,048	1851	153,499	1,533,798	
1796	5,249		1852	189,076		
1797	6,039		1853	217,416		
1798	5,948		1854	234,312		
1799	8,947		1855	238,215		
1800	8,401		1856	253,492		
1801	5,775		1857	294,198		
1802	7,769		1858	226,725		
1803	6,601		1859	270,293		
1804	5,976		1860	322,593		
1805	10,130	70,452	1861	326,429	2,399,829	
1806	4,938		1862	395,637		
1807	5,119		1863	429,351		
1808	6,616		1864	576,935		
1809	8,919		1865	635,586		
1810	8,609		1866	558,520		
1811	8,516		1867	471,185		
1812	9,570		1868	453,624		
1813	9,744		1869	511,795		
1814	9,866		1870	568,277		
1815	9,336	91,527	1871	596,418	4,927,339	
1816	8,619		1872	785,914		
1817	9,284		1873	881,106		
1818	7,920		1874	749,127		
1819	8,692		1875	706,795		
1820	9,980		1876	634,207		
1821	11,388		1877	697,065		
1822	7,512		1878	693,511		
1823	27,000		1879	688,628		
1824			1880	954,659		
1825		1881	1,035,014			
1826		1882	1,250,179			
1827	12,600	1883	1,297,523	7,377,428		
1828	20,967	1884	1,261,650			
1829	21,935	1885	1,254,510			
1830	27,269	1886	1,373,666			
1831	37,170	140,820	Total.....		24,919,113	
1832	50,396					
1833	64,743					
1834	50,813					
1835	56,434					
1836	107,593					
1837	118,942					
1838	106,730					
1839	145,962					
1840	101,198					
		839,981				

SUMMARY.

1785 to 1790	14,349	1831 to 1840	839,981
1791 to 1800	51,048	1841 to 1850	1,533,798
1801 to 1810	70,452	1851 to 1860	2,399,829
1811 to 1820	91,527	1861 to 1870	4,927,339
1821 to 1830	140,820	1871 to 1880	7,377,428

GOLD GENERAL STATEMENT FOR THE YEAR 1886.

Shewing the number of Mines, Days' Labor performed, quantities of Quartz crushed, yield of Gold, &c., for the year ended December 31st, 1886.

DISTRICTS.	Number of Mines.	Days' Labor.	Mills.	Steam Power.	Water Power.	Quartz, etc., crushed.	Yield per Ton.		Maxim. Yield per Ton.		Total Yield of Gold.	
							Oz.	Dwt. Gr.	Oz.	Dwt. Gr.	Oz.	Dwt. Gr.
Caribou	3	15394	3	2	1	3087	0	14 10	2	1 0	2233	17 16
Darr's Hill	1	27221	1	...	1	11628	0	11 4	1	6 0	6509	0 0
Montagu	1	1434	2	2	...	77	1	2 18	9	1 0	87	14 0
Oldham	3	13043	2	1	1	1026	2	2 20	12	1 0	2199	3 23
Renfrew	1	3679	2	...	2	428	0	18 15	1	0 0	233	17 0
Sherbrooke	6	17669	7	3	4	2850	0	9 10	3	18 12	1341	3 9
Stormont	2	3142	2	2	...	429	1	0 6	1	18 0	435	0 0
Tangier	2	6399	2	2	...	936	0	17 17	1	7 0	360	19 14
Uniacke	2	3146	3	3	...	1263	0	5 2	2	0 0	320	17 3
Waverly	1	2736	1	1	...	508	0	12 22	1	19 0	329	2 0
Unproclaimed, &c.	5	35017	10	7	3	6778	1	7 0	17	10 0	9312	0 22
Total	27	128880	35	23	12	29010	0	16 2	17	10 0	23363	5 15

MONTHLY STATEMENT FROM EACH GOLD DISTRICT.

MONTH.	CARRIBOU.						DART'S HILL.							
	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Grs.	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Grs.
January.....	2	1333	53	213	75	5	2	1	.....	..	947	1297	..	..
February.....	2	1172	46	274	149	13	20	1	.....	..	840	612	..	..
March.....	3	1633	65	.....	1	3	15	1	.....	..	1147	1045	..	..
April.....	2	1144	46	295	160	7	..	1	3110	124	1065	730	..	..
May.....	4	1228	49	260	480	10	..	1	3060	122	985	373	..	..
June.....	3	1016	40	247	181	15	1	1	2880	115	983	562	..	..
July.....	3	1281	50	177	181	12	6	1	3017	121	1061	342	..	..
August.....	5	1260	50	345	239	13	6	1	3080	123	803	383	..	..
September.....	2	1075	43	503	291	4	..	1	2998	120	873	269	..	..
October.....	2	1258	50	136	76	16	..	1	3116	124	1043	296	..	..
November.....	4	1461	58	283	109	..	7	1	3000	120	955	297	..	..
December.....	6	1533	61	354	286	17	7	1	2960	119	926	303	..	..
Totals.....	3	15394	.....	3087	2233	17	16	3	27221	.....	11628	6509	..	..

MONTHLY STATEMENT FROM EACH GOLD DISTRICT.—(CONTINUED).

Month,	MONTAGU.						OLDHAM.							
	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Grs.	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Grs.
January.....	1	.....	.....	.....	..	..	..	2	866	34	56	25	2	9
February.....	1	.....	.....	.....	..	..	..	2	882	35	70	155	1	..
March.....	1	.....	.....	.....	..	..	..	2	1166	47	94	75	16	..
April.....	1	64	.....	.....	..	..	..	2	973	39	93	315	3	4
May.....	1	143	6	3	3	18	..	4	1353	54	98	401	14	5
June.....	2	263	10	8	14	9	..	4	1227	49	96	174	6	12
July.....	1	.....	.....	.....	..	..	..	3	970	38	144	403	13	17
August.....	1	10	.....	.....	..	..	..	4	1193	47	45	46	16	..
September.....	1	179	7	.....	..	..	..	3	1034	41	65	105	13	..
October.....	1	308	12	.....	..	..	..	4	1143	45	126	209	10	..
November.....	1	342	13	21	61	2	..	3	1118	45	25	61	2	..
December.....	1	125	5	45	8	5	..	3	1118	45	119	225	6	..
Totals.....	1	1434	.....	77	87	14	..	3	13043	.....	1026	2199	3	23

MONTHLY STATEMENT FROM EACH GOLD DISTRICT.—(CONTINUED).

Month:	RENFREW.					SHERBROOKE.								
	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Grs.	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Grs.
January	1	561	22	145	68	6	..	5	1456	58	240	98	2	7
February	1	426	17	121	58	7	..	5	1080	43	99	72	17	0
March	1	510	20	92	92	12	..	6	1525	61	277	278	7	4
April	1	236	9	10	..	12	..	6	1040	43	242	96	4	..
May	1	263	10	.....	..	..	..	6	1430	57	171	63	17	10
June	1	212	8	10	..	7	..	8	2015	81	131	70	16	12
July	1	216	8	22	7	5	..	8	1995	80	211	156	6	..
August	1	239	9	28	6	8	..	8	1560	62	392	166	6	..
September	1	256	10	.....	..	..	..	7	1612	68	54	107	2	..
October	1	228	9	.....	..	..	..	6	1560	62	224	49	5	..
November	1	231	9	.....	..	..	..	6	1586	63	390	106	6	..
December	1	301	12	.....	..	..	..	5	810	32	219	75	14	..
Totals	1	3679	....	428	233	17	..	6	17669	....	2850	1341	3	9

MONTHLY STATEMENT FROM EACH GOLD DISTRICT.—(CONTINUED).

Month,	STORMONT.						TANGIER.							
	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Grs.	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Grs.
January.....	1	334	13	37	67	12	..	2	700	28	.....	....	..	..
February.....	1	272	11	43	83	11	..	2	841	33	77	43	10	..
March.....	2	700	28	10	14	4	..	3	879	35	259	89	13	12
April.....	2	493	20	60	68	16	12	3	797	32	20	6	19	..
May.....	1	267	10	21	27	3	12	2	597	24	332	138	12	..
June.....	1	250	10	25	17	19	..	3	858	34	144	43	..	..
July.....	1	46	2	1	..	15	12	2	374	15	10	13	6	..
August.....	1	84	3	1	1	2	..	3	522	22	12	6	..	..
September.....	1	31	2	80	72	8	12	2	506	29	22	7	10	..
October.....	2	231	9	71	35	8	..	1	150	6	.....	....	..	..
November.....	2	295	12	23	18	10	..	1	75	3	49	6	14	2
December.....	2	138	5	57	27	10	..	1	100	4	11	5	15	..
Totals.....	2	3142	....	429	435	..	..	2	6399	....	936	360	19	14

MONTHLY STATEMENT FROM EACH GOLD DISTRICT.—(CONTINUED.)

MONTH.	UNIAQUE.						WAVERLY.							
	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Grs.	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Grs.
January.....	3	420	17	166	55	14	6	1	504	20	45	24	18	..
February.....	2	375	15	55	6	11	..	1	557	22	43	28	3	..
March.....	2	344	14	33	20	8	..	1	578	23	43	32	14	..
April.....	2	320	13	124	36	13	..	..	.....	.....	39	37	10	..
May.....	2	180	7	109	30	19	6	..	.....	.....	52	43	16	..
June.....	2	119	5	87	28	18	..	..	.....	.....	57	26	8	..
July.....	1	30	1	20	3	9	..	1	350	14	76	38	8	..
August.....	1	50	2	110	24	12	..	1	240	10	25	15	8	..
September.....	1	40	2	156	37	4	..	1	92	4	8	5	2	..
October.....	1	389	16	78	12	17	..	1	140	5	25	23	13	..
November.....	1	592	24	178	34	10	..	1	130	5	36	19	2	..
December.....	1	287	12	147	29	1	15	1	145	5	59	34	..	..
Totals.....	2	3146	....	1263	320	17	3	1	2736	.....	508	329	2	..

MONTHLY STATEMENT FROM EACH GOLD DISTRICT.—(CONTINUED.)

MONTH.	UNPROCLAIMED.					
	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt. Grs.
January	2	274	11	140	222	10
February	2	374	18	168	453	10
March	2	516	20	475	746	9
April	3	811	32	305	426	..
May	4	614	24	414	908	4
June	7	1718	69	548	852	7
July	6	5710	228	483	850	10
August	5	5887	231	445	602	14
September	5	5992	239	1256	1725	16
October	6	4054	162	797	1056	..
November	6	4455	178	923	781	4
December	8	4612	184	824	686	15
Total	5	35017	.....	6778	912	00
						22

GOLD.

GENERAL ANNUAL SUMMARY.

YEAR.	Total ounces of Gold extracted.			Stuff Crushed.	Yield per Ton of 2,000 lbs.			Total Days' Labor.	Average earnings per man per day and year, at 300 working days, \$18 per oz.	
	Oz.	Dwt.	Gr.		Oz.	Dwt.	Gr.		A day.	A year.
1862	7275	0	0	6473	1	2	11	156,000	\$ 83	\$249
1863	14001	14	17	17002		16	11	273,264	92	276
1864	20022	18	13	21434		18	16	252,720	1 42	426
1865	25454	4	8	24423	1	0	20	212,966	2 15	645
1866	25204	13	2	32161		15	2	211,796	2 14	642
1867	27314	11	11	31386		17	9	218,894	2 24	672
1868	20541	6	10	32262		12	17	241,462	1 53	459
1869	17868	0	19	35147		10	4	210,938	1 52	456
1870	19866	5	5	30829		12	21	173,680	2 05	615
1871	19227	7	4	30791		12	11	162,992	2 12	636
1872	13094	17	6	17093		15	7	112,476	2 09	627
1873	11852	7	19	17708		13	9	93,570	2 28	684
1874	9140	13	9	13844		13	5	77,246	2 12	636
1875	11208	14	19	14810		15	4	91,698	2 20	660
1876	12038	13	18	15490		15	13	111,304	1 94	582
1877	16882	6	1	17369		19	10	123,565	2 46	738
1878	12577	1	22	17990		13	23	110,422	2 05	615
1879	13801	8	10	15936		17	8	92,002	2 34	702
1880	13234	0	4	14037		18	20	103,826	2 18	654
1881	10756	13	2	15556		12	20	126,308	1 52	456
1882	14107	3	20	22081		12	18	106,884	2 37	711
1883	15446	9	23	25954		10	21	97,733	2 84	862
1884	16059	18	17	25147		12	18	118,087	2 40	720
1885	22203	12	20	28890		15	4	157,421	2 53	759
1886	23362	5	13	29010		16	2	128,880	3 25	975
Total.	412542	9	4	553823	.....			3766,494		

INTERCOLONIAL RAILWAY.

STATEMENT showing number of tons of Coal received at the following Stations from Mines in Nova Scotia, for Year ending 31st December, 1886.

Stations.	No. Tons.	Stations,	No. Tons.
Halifax	38424	Penobsquis	2137
Dartmouth	6948	Sussex	403
Bedford	574	Apohaqui	23
Windsor Junction	4136	Norton	12
Wellington	68	Passekeag	6
Enfield	454	Hampton	408
Elmsdale	173	Rothsay	62
Milford	60	Coldbrook	6709
Shubenacadie	240	St. John	38618
Stewiacke	273	Berry's Mills	12
Brookfield	128	Weldford	13
Truro	6900	Kent Junction	386
Valley	18	Rogersville	6
West River	36	Chatham Junction	552
Glengarry	24	Derby	6
Hopewell	1393	Newcastle	53
New Glasgow	13391	Bathurst	605
Pictou Landing	82081	Petit Roche	18
Belmont	66	Jaquet River	12
Debert	6	New Mills	12
East Mines	18	Charlo	6
Londonderry	66608	Dalhousie Junction	50
Wentworth	30	Campbellton	102
Greenville	24	Metapedia	106
Thomson	6	Cedar Hall	6
Oxford	424	Little Metis	6
River Phillip	6	St. Octave	6
Athol	6	Ste. Flavie	6
Maccan	6	Rimouski	31
Nappan	12	Trois Pistoles	45
Amherst	3969	St. Arsene	12
Aulac	305	Riviere du Loup	32
Sackville	1877	St. Roche	13
Dorchester	1044	St. Henri	11419
Memramcook	309	Point Levis	17372
Shediac	235	Chaudiere (Local)	80989
Point du Chene	42	Do. (West)	65732
Moncton	10239	Points E. Ext. Railway	607
Salisbury	1108		
Petitcodiac	289		
		Total	468543

From the following Stations:

STATIONS.	No. Tons.
New Glasgow	27895
Stellarton	128577
Hopewell	666
Drummond	29032
Springhill	276549
Maccan	5824
Total	468543

MONCTON, N. B., February 10th, 1887.

MINERALS OTHER THAN THOSE LEASED FROM THE CROWN.

IRON ORE MINING.

LondonderryTons. 44,388

AVERAGE FORCE EMPLOYED.

Skilled workmen:

	No. of men.	Days' Labor.
Under ground.....	70	18,932
Above ground.....	14	4,296

Unskilled workmen:

Above ground.....	30	8,024
Under ground.....	52	12,574
	166	.....

LIMESTONE.

St. Peters	Tons.	5,441
Pugwash	"	148
Londonderry (ankerite)	"	947
Brookfield	"	13,729
Total		20,265

BARYTES.

Henderson & Potts, }		Tons. 230
Brookfield. }		
Average force employed daily.....		3

GRINDSTONES, ETC.

Lower Cove, Cumberland Co., Messrs. A. Seaman & Co }Tons. 1,600	Value.....\$22,400
--	------------------	--------------------

MOULDING SAND.

Windsor	Tons.	200	Value.....\$	200
---------------	-------	-----	--------------	-----

MANGANESE.

*Tenny Cape.....	Tons.	171	Value.....\$	12,066
*Cheverie.....	"	6	"	358
Cornwallis	"	250	"	
East Onslow	"	20	"	1,800
Halifax.....	"	18½	"	590

†ANTIMONY.

Rawdon	Tons.	64½	Value.....\$	26,370
--------------	-------	-----	--------------	--------

Tenny Cape out-put	Tons.	200
--------------------------	-------	-----

†GYPSUM.

Windsor.....	Tons.	96,087	Value.....\$	96,119
Cheverie	"	23,272	"	17,509
Walton.....	"			
St. Ann's, C.B.....	"	4,300		
Lennox Passage	"			
Halifax	"	94	"	492
Total	"	123,753		

BUILDING STONE.

Antigonish	Tons.	15	Value.....	\$60
------------------	-------	----	------------	------

Amounts exported.

HALIFAX.

*Export Statement; the Produce of the Mine from the Port of Halifax
for the Year Ending 31st December, 1886.*

Article.	Quantity.	Value.
Coal .....Tons.	23,397	\$74,027
Gold.....		373,857
Gypsum.....Tons.	94	492
Coal Oil.....		313
Antimony .....Tons.	645	26,370
Copper Ore..... "	1	160
Manganese "	18½	590
Gold Refuse:		150
Salt .....Bush.	43,881	8,308
Stone and Marble.....		195
		<hr/>
		\$484,462

FINANCIAL STATEMENT.—GOLD.

Mines Department for Twelve Months ended 31st December, 1886.

DISTRICTS.	RECEIPTS.			EXPENDITURE.				
	Rents.	Royalty.	Totals.	Return Rents.	Return Royalty.	Royalty Commission.	Salaries and Surveys.	Totals.
Caribou.....	\$114 00	\$879 87	\$993 87	.....	.....	\$33 77	.....	\$33 77
Darr's Hill.....	.....	2644 68	2644 68	.....	.....	.....	.....	.....
Fifteen Mile Stream.....	276 00	.....	276 00	16 00	.....	.....	\$64 25	80 25
Gay's River.....	54 00	.....	54 00	.....	.....	.....	10 00	10 00
Lawrencetown.....	.....	10 95	10 95	.....	.....	.....	.....	.....
Montague.....	64 00	160 87	224 87	.....	.....	.....	.....	.....
Oldham.....	8 00	706 85	714 85	.....	.....	7 69	36 00	43 69
Ovens.....	62 00	1 19	63 19	.....	.....	16 13	.....	16 13
Renfrew.....	204 00	134 48	338 48	.....	.....	6 72	36 00	42 72
Sherbrooke.....	118 00	492 27	610 27	12 00	.....	25 26	446 24	483 50
Stormont.....	338 00	340 88	678 88	22 00	.....	.....	39 50	61 50
Tangier.....	36 00	176 67	212 67	80 00	.....	.....	27 12	107 12
Uniacke.....	.....	225 56	225 56	.....	.....	2 83	97 50	100 33
Waverley.....	12 00	90 61	102 61	8 00	46 60	.....	.....	54 60
Wine Harbor.....	34 00	5 80	39 80	.....	.....	.....	5 50	5 50
Unproclaimed.....	2474 00	2679 48	5153 48	408 00	.....	90 35	545 81	1044 16
Prospecting Licences.....	.....	.....	8896 72	.....	.....	.....	.....	460 51*
	\$3794 00	\$8550 16	\$21240 88	\$546 00	\$46 60	\$182 75	\$1307 92	\$2543*78

*Return.

REPORT

Charles H. Stuart

OF THE

DEPARTMENT OF MINES,

NOVA SCOTIA,

FOR THE YEAR 1887.



HALIFAX, N. S. :
COMMISSIONER OF PUBLIC WORKS AND MINES,
J. L. PINTER.
1888.

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CORRECTION.—Page 3, for "Barytes, 4,000 tons," read "400 tons."

DEPARTMENT OF MINES.

REPORT FOR THE YEAR 1887.

*To His Honor Matthew H. Richey, Esq., Lieutenant-Governor of the
Province of Nova Scotia, &c., &c.*

MAY IT PLEASE YOUR HONOR,—

I respectfully present herewith to Your Honor the Annual Report of the Inspector of Mines, containing an account of the progress of mining operations, together with statistical information compiled by him from official and other returns.

I remain,

Your Honor's obedient servant,

CHARLES E. CHURCH,
Commissioner of Public Works and Mines.

HALIFAX, March 2nd, 1888.

REPORT

ON THE

MINES OF NOVA SCOTIA,

BY EDWIN GILPIN Jr., A. M., F. G. S.,

(Fellow of the Royal Society of Canada, Etc.)

OFFICE OF INSPECTOR OF MINES,

HALIFAX, March 1st, 1888.

TO THE HONORABLE

CHARLES E. CHURCH, M. P. P., M. E. C.,

Commissioner of Public Works and Mines.

SIR,—I beg leave to submit the following report on the Mines of Nova Scotia, for the year ending Dec. 31st, 1887.

The following summary shows, so far as I have been able to learn, the mineral production of Nova Scotia during the year 1887, compared with that of the previous year :

	1886.	1887.
Gold.....Ounces.....	23,362	21,211
Iron Ore .....Tons.....	44,388	43,532
Manganese Ore	" 427	691
*Coal raised	" 1,502,611	1,670,838
*Coke made	" 31,604	28,748
†Gypsum.....	" 123,753	116,346
Building Stone	" 8,000	9,271
Barytes	" 230	4,000
†Grindstones, &c	" 1,600	32,669 †
†Moulding Sand.....	" 200	160
†Antimony Ore	" 645	400
Limestone	" 20,265	31,471

Through the kindness of the Collectors of Customs at the various ports of the Province, I am enabled to give further details under this head at the end of the report.

* Ton of 2240 lbs.
† Amount exported.
‡ Value in dollars.

In addition to detailed notices of the operations of each mine, and the usual statistical tables, I submit a summary of the amounts and values of minerals produced not paying royalty to your Honorable Government.

I also beg to enclose the reports of Wm. Madden, Jr., Esq., Deputy Inspector for the Counties of Cumberland, Pictou and Colchester, and of P. Neville, Esq., Deputy Inspector for Cape Breton.

COAL TRADE.

The total sales for the year 1887 amounted to 1,519,684 tons, against 1,373,666 tons in 1886; being an increase of 146,018 tons.

As compared with the sales of the year 1886 the most noticeable points are:

The home sales were 469,464 tons, compared with 460,237 tons in 1886.

The Province of Quebec took 650,858 tons, against 538,762 tons in 1886, and 493,917 tons in 1885, and 396,782 tons in 1884.

The sales to New Brunswick were 186,511 tons, compared with 175,918 tons during the preceding year.

Newfoundland took 82,053 tons, against 71,476 tons in 1886.

The sales to Prince Edward Island were 50,615 tons, against 49,168 tons in 1886.

The sales to the United States comprised 2,558 tons of round, 35,722 of slack, and 35,612 tons of run of mine coal; in all 73,892 tons, against 66,003 tons in 1886. Of this amount all the run of mine was sent from Parrsboro. The total Cumberland shipments being 41,387 tons. Cape Breton sent to the same market 29,285 tons of slack and 1,851 tons of round coal.

The coal trade to other countries presented no points of interest.

CUMBERLAND COUNTY.

The total sales of this county amounted to 465,148 tons, against 416,266 tons in 1886.

The home sales were 91,335 tons, against 103,886 tons in 1886.

The sales to New Brunswick amounted to 130,305 tons.

The Province of Quebec took 202,121 tons, compared with 188,935 tons in 1886.

The Port of Parrsboro has become an important outlet for the Springhill district, and during the past year 41,387 tons were shipped.

The freights from this point to the United States are comparatively low, and the harbor remains open nearly all the year. The Cumberland Railway and Coal Company are constructing a line from Springhill to Oxford, which will give them an outlet to a shipping point on the Gulf of St. Lawrence, and cheapen the cost of laying down their coal at Quebec and Montreal. The completion of the Joggins and Macan Railway has led to the re-opening of the small collieries which have been worked at various periods between Macan and the Joggins shore. The Joggins Mining Association, which has been compelled to close its mines every winter, is now able to work steadily; and it is to be hoped that its owners will reap the benefits of their spirited policy.

COLLIERIES.

Chignecto.—The workings at this mine have not undergone much change, the output having been 16,480 tons. In my last report I referred to the trouble experienced at this mine from spontaneous combustion, and similar difficulties have been experienced last year. The discovery recently made that carbon monoxide requires the presence of moisture before it will ignite, may serve to explain some of the phenomena observed in mine fires. In this seam the heating noticed when the roof and top coal become mixed, turns to fire if water be not kept carefully from it. A similar cause may explain explosions from mine fires when they are surrounded by an atmosphere apparently so full of carbonic acid that ignition of fire damp appears improbable.

At the Joggins mine some trouble has been experienced from a fault, but it was driven through and the coal found to be of good quality. The output of the mine was 16,649 tons, against 22,243 tons in 1886.

At the Macan and Hebert mines there was little done of consequence. The engine and bank house of the Patrick mine were burned down in the fall, but at the close of the year repairs were effected.

Springhill.—The operations at this mine have, as usual, been on a very large scale. The opening in the Syndicate seam has been continued, and the East levels holed into the North slope levels. The coal, which was at first disturbed, has become more regular and settled, and the slope will form an important addition to the resources of the district. Further particulars will be found in Mr. Madden's report. The output of the mine was 466,223 tons compared with 416,769 tons in 1886.

PICTOU COUNTY.

The total sales were 339,034 tons, against 369,026 tons in 1886, and 396,000 tons in 1885.

The home sales were 193,062 tons, against 202,516 tons in 1886.

The Province of Quebec took 95,310 tons, as compared with 95,499 tons in 1886.

Acadia Coal Company.—The output of this Company was affected in the early part of the year by a strike against a reduction of coal cutting rates at the Albion mines. At the Vale Colliery the McBean seam was worked steadily, and little done at the six feet seam, which was being unwatered and prepared for work at the close of the year. The output was 230,611 tons. At the Albion mines the Third seam was worked, and the slopes and levels extended. The south side of the McGregor was worked. Preparations were made for beginning a slope in the Cage Pit or Deep Seam to the rise of the old shaft, to strike an old balance near the East level workings, in order to win the coal to the north-east of the present workings. This project unfortunately was prevented by the discovery that the fire in the West rise workings of the Cage pit was not extinguished. The fire had been built off I think in 1872, and it was believed to be quite out, especially as the fire in the same mine, caused by the Foord pit explosion, was found to be out when the mine was re-entered. During the summer part of the pillars in a balance in the Third seam workings under the Cage pit seam had been drawn, the fall of the roof extended up to it, and stythe came into the Third seam workings. The balance was isolated by stoppings, and at the close of the year no trouble was anticipated. In the beginning of this year, however, fire broke out in the Third seam with great violence, destroying the bank head and necessitating the closing of the mine.

At the Foord pit the water has been lowered to about forty feet above the sheets, at this point the fire was found to have injured the cage slides, etc., but the timbering appeared to have been uninjured. It is expected that, if explorations show the feasibility of building off the old workings, these costly pits, with their massive and valuable engines, will be again available for working the deeper seams. There were 10,180 tons of coke made.

Acadia Colliery.—As usual, the systematic workings of this mine present no new points of interest. The new 3,100 feet levels have been extended in readiness for the regular sequence of work. Mr. Madden reports that for twelve months no accident has occurred in this mine.

Intercolonial Coal Company.—The operations of this Company have been vigorously prosecuted during the past year. The slopes are now down 3,200 feet. The extraction of pillars has been continued, but great care has been required, owing to the constant exudation of gas. The Second seam pit was unwatered, and the levels extended. The output was 152,825 tons, against 108,498 tons in 1886.

EAST RIVER AREA.

Messrs. Muir & Sons re-opened the old George McKay slope, close to the east line of the East River area. They deepened the slope, and have driven west until their faces are past the old workings. The seam runs nearly four feet in thickness, and is of excellent quality, as shown by the following analysis made for the Geological Survey of Canada :—

Hygroscopic Water.....	none.
Volatile Combustible Matter.....	29.98
Fixed Carbon	62.15
Ash, (Buff colored).....	7.87
Sulphur	trace.
	<hr/>
	100.00

The returns show 1,145 tons of coal extracted.

Some prospecting was done by Mr. McNeil on the Merigomish area but I have no particulars of his work.

Mr. A. McG. Barton informs me that he bored 220 feet for coal on the west side of the West River, at the Twelve Mile House. The first 90 feet was through gray rock, and the balance through shale, and red and gray sandstone. Two bore holes, 60 and 70 feet deep, were put down on the east bank of the River, through similar material. The work will be resumed next season.

CAPE BRETON COUNTY.

The total sales were 715,442 tons, compared with 588,191 tons in 1886.

The home sales were 188,781 tons, against 153,652 tons in 1886.

New Brunswick took 30,464 tons, as compared with 26,284 tons in 1886.

The sales to Newfoundland were 81,323 tons, compared with 71,018 tons during the preceding year.

The sales to Quebec show 329,229 tons, against 254,328 tons in 1886.

The United States took 1,851 tons of round and 29,285 tons of slack coal.

COLLIERIES.

Sydney.—The workings have been steadily continued, and the output was 170,782 tons, against 139,646 tons in 1886. The level workings were partly stopped in the fall, owing to a small leak of salt water in the roof. There is a good cover at this point, and it may be a leakage due to a fault or disturbance of the strata near this point,

as the workings are approaching the locality where the transition between the level seams of the Sydney district and the pitching seams of Low Point may be expected to begin. The Francklyn lease has been worked through the Sydney Colliery, and 5,422 tons extracted.

Victoria.—The operations at this mine have been steadily continued during the year, and the output shows an increase, being 61,057 tons, against 50,156 tons in 1886. Mr. Donald Lynk, many years manager of the mines in the Lingan district, has resigned his position, and Mr. I. G. S. Hudson has been appointed in his place.

Reserve.—At this mine the French slope has been extended, and further provision made for pumping and ventilation. The connections with the Emery seam have been completed, and coal can be raised whenever required. The output of the mine was 88,849 tons, against 81,783 tons in 1886. The concentration of the works, shops, etc., at the Reserve has been found satisfactory from all points. In the new workings the fire clay parting has run out, leaving about 8 feet 9 inches of good coal. It will be remembered that this parting in the Phelan seam is insignificant on the shore of Lingan Bay, swells in about one-half a mile, until the seam is divided in two by 9 feet of stone, having 3 feet of coal above and 6 feet of coal below, and again runs out as noticed above.

International.—At this mine the output was 109,404 tons, as compared with 118,129 tons in the preceding year. In driving the rooms toward the shore of Lingan Bay the water from the coal was found to be brackish, while that from the roof was fresh. A barrier of 400 feet was left along the shore, with a view to the rapid wasting of the coast line. The level engine was found to work satisfactorily. As the workings of this Colliery have become very extensive, the management contemplate providing mechanical ventilation.

Bridgeport.—Mr. Mitchell has continued working, and has commenced the extraction of pillars above the water level. The output was 19,265 tons, against 14,344 tons in 1886.

Little Glace Bay.—A new rise incline has been driven through the old works to shorten the haulage from the face. The output has been 79,516 tons, against 33,382 tons in 1886. The harbor has been maintained in good repair during the season, and is now of more importance than a private dock, as the other harbors of Lingan and Caledonia have been abandoned.

Ontario.—The level has been extended, and some coal taken out.

Block House.—A few thousand tons have been extracted from old pillars to the rise of the water level. A considerable portion of the gear seized for royalty has been disposed of, and the Government are desirous of finding purchasers for the engines and pumps, etc.

Gowrie.—This mine has been extensively worked, the output being 128,477 tons, compared with 93,307 tons in 1886. About 800 tons of patent fuel were manufactured. This fuel finds favor for steam pur-

poses, being largely used by the French men-of-war, and should be well adapted for open grates. It would appear that a briquette machine set up in a large New England town, or in Montreal, and taking slack from run of mine coal, screened at port of discharge, would prove profitable. The extraction of pillars has been continued in the rise workings, and the coal found beyond the fault struck in the main level.

Caledonia.—The operations in the new lift have been continued steadily to the East and West. Pillars were drawn in the old workings. On the surface the rolling stock was largely increased. In the fall the ventilation was improved by a systematic arrangement of doors, enlarged over casts, etc. The output was 108,844 tons, compared with 72,810 tons in 1886.

Reference has been made in previous reports to the Eight foot seam at Cow Bay, usually referred to as the Neville seam, from its discovery a number of years ago by Mr. P. Neville, now Deputy Inspector of Mines. Explorations show that the seam lies nearly in the horizon of the Long Beach seams of Northern Cow Bay, underlies the Block House and Gowrie areas, and extends a considerable distance to the North of them. A large tract of the seam has been acquired by Montreal parties, and it is hoped that it may soon be developed. I have not seen any analysis of the coal, which is said to be of excellent quality, and it will without doubt prove a most valuable addition to the coal resources of this district. A branch line about two miles long would connect the new property with the Sydney and Louisburg Railway.

OTHER COUNTIES.

During the summer three seams of Anthracite coal were reported as having been discovered near Mabou, Inverness County, and to be from three to eight feet thick. The samples which came under my notice resembled the so-called Anthracite of Lepreaux, near St. John, New Brunswick, and evidently contained considerable percentage of ash. The Lepreaux coal occurs in strata of Devonian age, and may be classed as a highly carbonaceous shale.

A little work was done at Coal Brook, Onslow, Colchester County, on a coal bed said to be four feet thick. Messrs. W. J. Fraser and H. Ross did a little work on their area at Mabou. The expectation of a railway from Sea Coal Bay, in Richmond County, to Margaree, has to some extent revived an interest in the Western coal fields of Cape Breton.

In Antigonish County, at Hallowell Grant, explorations conducted by Mr. A. McBean are said to have shown a bed of oil coal several feet in thickness. The existence of several beds of this mineral, and of large deposits of highly bituminous shale in this district, was proved by exploratory works carried on a number of years ago.

DEPUTY INSPECTORS' REPORTS.

DISTRICT OF PICTOU, COLCHESTER, AND CUMBERLAND.

WESTVILLE, N. S.,

December 31st, 1887.

To E. GILPIN, Esq.,
Inspector of Mines, &c.

DEAR SIR,—I have the honor to herewith submit you a statement of my work as Deputy Inspector of Mines in the District of Pictou, Colchester and Cumberland, for the year ending the 31st December, 1887.

SPRING HILL MINES.

This mine has attained to a daily output of from 1800 to 2000 tons. Too much cannot be said of the caution exercised by the management in respect to the care of the mine, and to the safety of the workmen engaged therein. A few accidents of a fatal nature have occurred however, as see noted in table at end of this report. The South slope, in my last report, was down about 1800 feet; in March of this year they commenced sinking it again, and in May had gained a depth of about 2200 feet. The coal looks very good. In June they finished sinking the East slope, which was down about 1900 feet. A new blow-down fan has been erected at the East slope, but the airways, not being fully completed, a satisfactory test as to its effective powers has not been obtained. Gas is evolved in this slope and in the West slope. The new fan erected at West slope is giving very good satisfaction. The South slope and North slope have, during the year been connected, and doubts set at rest as to the identity of the seam. The water of the South slope will now be conducted to the lodgement of the North slope, and from thence delivered at surface by the Allison pump.

In my official inspection of these Mines I have found the law complied with and the discipline good.

CHIGNECTO.

This mine has not worked extensively during the year. The management have succeeded in "building off" the fire on east side and have it under control. In November, some indications of fire were noticeable on the west side, but the management took prompt measures to "build it off," which measures were successful. I have always found the air satisfactory in this mine, and the management complying with the laws. In December an opening had been made in the "stopping," and the fire to all appearances was extinguished

JOGGINS.

The break, to which reference was made in my last report, proved to be about 70 feet thick, at which point the coal was struck again and maintained a uniform good appearance for a distance of some 200 feet, where they encountered another break, which proved to be about 60 feet thick when the coal was again obtained. I found the ventilation very fair and the law complied with.

PATRICK.

In my visit in March I found the engine house, &c., finished, the water being taken out of the Slope, and in April I was able to inspect the working faces, the water being all out. A small number of men were kept at work during summer. The ventilation was not all that could be desired. A new airway has been recently driven, which will materially increase the volume of the air. On November 3rd the engine house was burnt, and at my visit in December they had not succeeded in erecting a new one, but anticipated being able to start about the 15th or 18th of December to extract the water from the mine.

LAWSON.

This mine has been standing with water for a considerable portion of the year. A small force of men, averaging about 5 or 6, have been at work at different times. In December every preparation has been made to enable them to extract a fair output of coal for the incoming season. The Minudie, Milner and Boston Mining Co., and Scotia mines, have done no work this year.

INTERCOLONIAL COAL COMPANY.

At this mine they have sunk a distance of 560 feet in their slopes, which are now down a distance of about 3200 feet from the surface. A considerable amount of successful pillar working has been carried on during the year. On the north side when some gas was given off, the management promptly discontinued the use of powder. Later in the season they began to extract the pillars between the 1700 feet level and the 2200 feet level on south side; gas was given off in these pillars also, but every possible precaution in such cases was adopted by the management. A very satisfactory quantity of air travels the working faces.

The water was extracted from the Scott pit in November, and the South Level extended with a view of prospecting the seam.

ACADIA COAL COMPANY, (LIMITED.)

Vale Colliery.—I have found in my inspections of this mine the air current circulating very satisfactorily through the working faces of the mine, and the law complied with. The management intend to open the workings of the 6 foot seam, which have been suspended since February, and have commenced to take out the water.

Acadia Colliery.—In this mine they have succeeded in extracting a good percentage of coal from the pillars of the top-lift. In all inspections I found the air well kept up to the working faces, and in consequence no gas is allowed to accumulate. The discipline in the mine is good, and it is a record worthy to be noted, that during the past twelve months not an accident has occurred in this mine. On the 3100 ft. lift levels are driven near by to the boundary line, main slope completed, also travelling slope and pipe head. Three balances are driven from 3100 foot level to 2400 foot level, and this winning is thus in a position to receive the full working plant of top lift as soon as the pillars are fully extracted. I might add as an item of interest to coal operators in general, that in this mine they utilize the pressure of water in the column pipe to extract the water from 3100 ft. lodgement to the main receiver, where a large pump is situated at 2400 ft. level.

Slopes Nos. 1 and 2, Douglas Seam, Stellarton.—A new fan of 12 ft. diameter, running about 25 revolutions per minute, but which can be increased, if necessary, to some 75 to 100 revolutions, has been erected which ventilates Nos. 1 and 2 slopes. These slopes are connected by a cross cut at the 1400 ft. level, and an undercast at furnace level. No. 2 slope is now down a distance of 2000 feet, and the work getting well opened up. In August they began to extract the pillars in No. 1 slope at 800 ft. level, and a considerable number were taken out, until, in December, there were signs of fire in the Cage Pit seam which overlies these slopes a thickness of about 130 feet intervening, and as some damp issued from the broken, the management thought it advisable to "build off" these pillars with brick stoppings, which has been done.

McGregor Pit.—Operations were resumed on the south side of this pit in January, and continued on to some extent during the year.

I have visited the Cage Pit workings on two occasions and found them in as good condition as could be expected; but I regret to say that the day subsequent to my visit in December, there appeared serious indications of fire being still in existence.

The management have succeeded in taking the water out of the Foord Pit to within about 50 feet of the bottom, and are now meeting with considerable obstruction, caused by the needles and slides in shaft being burned. Progress, in consequence, is necessarily slow, but they are patiently persevering with the view of gaining the bottom.

EAST RIVER.

John Muir & Son still continue work on this area, and had at some seasons of the year as high as twenty men, and at other seasons three or four men employed. At the present time eight men are at work. The coal maintains a uniform thickness and looks well. The air is satisfactory.

BLACK DIAMOND COMPANY.

A company, composed principally of New Glasgow capitalists, has purchased the Nova Scotia Coal Company's property, and has commenced work. They have utilized the old travelling road for hoisting, and have laid a track along the top level on West side, a distance of 1,500 feet, to a block of coal, where they anticipate working four or five close bords. They have erected a fan of about $5\frac{1}{2}$ feet diameter, with which they propose to ventilate the mine. A new bank house has been built, the old bank house and screens repaired, and a new engine house built. They have a siding from the Pictou Branch, which runs close by, affording them excellent facilities for shipping coal.

The Haliburton mine was opened in February by Andrew Wier. He did little or nothing during the summer, his sales depending altogether upon the immediate neighborhood.

I visited Acadia Iron Mines on the 15th October, A. D. 1887, and found the West shaft had been sunk, previous to my visit of last year, 50 feet, and a large Cameron pump placed in the bottom. They were extending the drifts East and West. Ventilation was good, and the mine looked well.

There have been a number of trifling accidents to those employed in the mines which I have inspected—which I have not given in the appended table. I think it right to say here that employees in coal mines should remember that they have an interest in the maintenance of good discipline equal to that of the owners and bosses. A reference to the special rules in force in nearly all the mines will show that, legally speaking, any man who neglects to report an infraction of the regulations in force in the mine in which he works, is directly culpable. To any right thinking collier this should be an unnecessary law, for he has it in his power, by precept and example, frequent opportunities to instil into the minds of his comrades the necessity for careful and intelligent obedience, which in no way can destroy proper self respect. The individual miner, as he works at his face, should remember that on his caution and intelligence his own safety and that of many others may rest at any moment.

Injuries from fall of roof and coal should never be due to individual recklessness, for every miner is entitled to proper supplies of timber, and to the prompt help and advice of those in charge whenever he detects danger.

I herewith append the usual tabulated statements, giving number of serious accidents and causes, volumes of air circulating, means of discharging water from mine, &c., &c.

I remain, your obedient servant,

WM. MADDEN, JR.,

Deputy Inspector of Mines.

ACCIDENTS, YEAR 1887.

No.	Date.	Mine.	Name.	Occupation.	Remarks.
1	Feb. 7	Spring Hill	Wm. McDonald	Miner	Killed by fall of coal from face of Bord.
2	" 17	Vale Colliery	Mat Spoors	Day overman.	Killed while timbering.
3	" 17	"	Wm. Hyde	Miner	" "
4	April 2	Spring Hill	George May	"	Fatally hurt.
5	May 28	"	— Cameron	"	Arm broken. Stone fell from roof.
6	June 25	"	James Mackie	Cage runner.	Leg broke; caught by cage in balance.
7	July 28	Drummond Colliery	John McEwen	Deputy	Hip dislocated. Cage run over him.
8	Sept. 2	Spring Hill	James Johnston	Blacksmith	Ribs broke, hip dislocated. Jammed by fall of rake against the wall in West Slope.
9	" 5	Douglas Seam, No. 2 Slope	Daniel McLean	Miner	Hurt inwardly. Jammed between the rake and wall trying to get on cars when in motion.
10	" 6	Spring Hill	Frank Welsh	"	Leg broke by the rake in West Slope.
11	" 10	Douglas Seam, No. 2 Slope	Wm. McKenzie	Miner	Leg broke. Fall of coal from pillar.
12	Oct. 6	Spring Hill	James Miller	"	Leg broke. Fall of coal from working face.
13	" 18	Vale	Angus O. Hanley	Boy	Killed. Three boxes run back over him on Main Slope.
14	" 29	Spring Hill	Wm. Booth	Miner	Burnt. Gas in West Slope; not serious.
15	Nov. 11	"	Peter Coleman	"	Cat badly on head and foot. Top coal fell on him.
16	Dec. 8	"	Thomas Guthro	"	Killed. Fall of frozen clay.
17	" 8	"	Clinton Crawford	"	" " "

Volume of Air in cubic feet per minute circulating in the Pictou and Cumberland Coal Mines—year 1887.

COMPANY.	MINZ.	Jan.	Feb.	Mch.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Mode of Ventilation.
Spring Hill Coal Comp'y	N. Slope	43,468	42,750	41,500	42,885	47,250	42,672	40,800	41,000	42,400	42,200	43,500	43,982	Threefans. Natural Ventilation. Furnace.
	W. "	22,000	22,000	21,100	23,100	42,200	22,000	41,160	40,200	42,100	42,200	42,850	41,705	
	E. "	42,000	42,000	40,200	41,000	32,000	31,500	31,200	30,000	31,800	34,350	33,700	33,200	
	S. "	13,000	....	14,500	14,000	13,000	13,100	12,700	23,400	21,500	22,000	20,500	22,700	
Chignecto Mine	Slope	28,200	26,100	24,200	....	20,000	19,706	21,200	20,500	23,000	22,000	23,500	23,900	Furnace.
Joggins	"	24,225	22,150	21,000	26,000	27,900	23,100	22,500	17,100	19,000	21,200	22,150	24,100	Furnace.
William Patrick	"	Idle.	Idle.	Idle.	3,100	3,000	2,700	2,200	Idle.	2,500	2,500	Idle.	Idle.	Natural Ventilation.
S. E. Freeman, (Lawson Mine)	Slope	Idle.	Idle.	2,000	Idle.	Idle.	1,700	1,650	1,000	Idle.	2,000	2,700	2,700	Natural Ventilation.
Intercolonial Coal Comp'y, Westville	Drummond Slopes	86,500	85,600	89,800	89,000	85,500	81,300	87,000	85,500	84,600	80,800	85,200	82,500	Exhaust Fan.
Acadia Coal Co'y, Limited.	Acadia Slope	60,000	45,000	40,000	44,600	57,680	59,000	62,000	68,000	44,800	50,500	58,000	62,200	Exhaust Fan.
	No. 1	Idle.	21,600	Idle.	Idle.	19,040	23,100	21,300	24,150	44,120	33,600	33,700	35,000	Fan.
	" 2	Idle.	12,700	Idle.	Idle.	16,600	20,000	18,000	23,040	33,800	25,200	25,500	27,000	
	McGregor Pit	48,000	20,000	Idle.	Idle.	Idle.	Idle.	Idle.	68,360	77,100	80,757	84,200	69,860	Exhaust Fan.
Acadia Coal Co'y, Limited.	Greener Slope (6 ft. Seam.)	....	....	18,500	Idle	for	bal	ance	of	year.	....	....	....	Blow-down Fan.
	McBean Slope	40,500	19,800	20,120	39,400	41,050	40,000	42,100	41,000	33,500	40,200	46,000	42,000	Exhaust Fan.
	McBean Slope (Old Seam.)	....	....	....	....	....	....	....	....	....	....	....	....	Natural Ventilation.
John Muir and Son, East River Area	Slope	2,300	2,000	2,300	2,250	1,500	1,000	1,800	1,200	1,000	1,700	1,950	2,200	Natural Ventilation.

DETAILS OF PUMPING APPLIANCES.

COMPANY.	Appliances.	Length of Stroke.	Diameter of Steam Cylinder.	Diameter of Water Cylinder.	Number of strokes per minute.	Steam pressure at boiler.	Distance of boiler from pump in ft.	Steam pressure at pump.	Vertical height of Discharge.	Pressure of head per sq. in. lbs.	Length of Steam Pipe.	Length of Water Pipes.	Diameter of Water Pipe.	Diameter of Steam Pipe.	Average gallons discharged per day.	Disch'rgs to mud pump. Disch'rgs at surface. Used as a spare pump.	Tons of water raised 1887.	Tons of coal raised year 1887.	REMARKS.
INTERCOLONIAL COAL COMPANY, Westville.	Cameron Pump. No. 8.	36 in.	18 in.	8 in.	20 to 40	lbs. 79½	480	lbs. 79½	350	lbs. 208	800	.....	.....	5 in.	.....	.....	.....	.....	Pipe covered with composition.
	No. 3-5.	12 "	10 "	4 "	40 to 60	80	1380	77½	300	130	900	900	3 x 2½	2 x 2½	60,000	.....	109,500	152,825	Pipes covered with a composition of clay and straw.
	No. 3-4.	12 "	7 "	3½ "	40 to 60	1780	1780	75	113	49	400	400	2 in.	2 in.	120,000 per day of 24 hours.	.....	219,000	.....	Covered for 40 ft. on bank with infusorial.
(Westville) ACADIA SLOPE.	Duplex Compound Pump.	24 "	12 H.P. 22 L.P.	5½ "	45	50 lbs.	2600	40	996	433	2500	2400	.....	4 "	.....	.....	219,000	.....	Approximate estimation.
McGREGOR PIT. Nos. 1 and 2 Slopes. Ford Pit.	Cameron Pump.	16 "	.....	4 "	30	45 "	200	40	180	78	200	180	3 in.	3 "	14,355	.....	26,197	32,850	Pipes covered with a composition of clay and straw.
	Hoisted by Tank	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	18,000	.....	484,625	230,611	Approximate estimation.
	Two Iron Tanks	Two	Iron Tanks	8 ft.	8 ft.	6 in x 6 in	6 ft.	x 3 ft.	Average	228 tanks	228 tanks	for 24 hours.	.....	.....	265,548	Disch'rgs to mud pump. Disch'rgs at surface. Used as a spare pump.	459,900	.....	Pipes covered with a composition of clay and straw.
VALE. McBean Slope. Connected.	Knowles.	30 in.	30 in.	8 in.	25	70 lbs	1400	60	650	282	1400	1200	.....	6 in.	234,000	.....	459,900	.....	Pipes covered with a composition of clay and straw.
	Cameron.	30 "	20 "	6 "	50	.....	500	.....	238	103	500	500	.....	4 "	252,000	.....	.....	.....	Pipes covered with a composition of clay and straw.
	Matheson	24 "	18 "	6 "	.....	.....	.....	.....	420	183	900	800	.....	.....	.....	.....	.....	.....	Pipes covered with a composition of clay and straw.
Greener or 6 foot Seam.	Cameron Pump. Blake Pump.	24 "	15 "	5 "	50	80	1240	70	365	159	1240	1 40	Idle during year.		.....	.....	.....	.....	Pipes covered with a composition of clay and straw.
	.....	12 "	8 "	5 "	60	.....	570	.....	130	57	510	310			.....	.....	.....	.....	Pipes covered with a composition of clay and straw.

ACADIA COMPANY, LIMITED.

Joggins.	Burrell and Johnston's Pump.	40 in.	20 in.	8½ in.	15	60	1500	38	205	89	1500	600	8 in.	4 in.	84,000	.....	153,300	16,649	Pipes not covered.
CHIGNECTO.	Cameron Pump.	14 "	14 "	6 "	.....	75	600	50	385	167	600	600	3 "	4 "	32,000	.....	58,400	16,480	Pipes not covered.
(Slope. Top.	Allison Pump.	6 ft.	30 "	14½ "	15	75	750	68	340	148	750	750	12 "	9 "	1,080,000	Disch'rgs at surface.	1976,000	.....	750 feet of pipes covered.
W. M. MINE.	Allison Pump.	.....	.....	.....	.....	.....	1430	55	310	134	680	680	12 "	6 "	1,080,000	Disch'rgs to top pump.	.....	.....	.....
.....	Spec. Blake.	.....	28 in.	11½ in.	32 in.	60	512	40	430	187	890	850	8 "	4 "	742,080	.....	1,354,296	.....	Covered from boiler to pit mouth with infusorial earth.
Spring Hill Mines.	Blake not used.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	Special, No. 7.	30 in.	22 in.	9 in.	40 in.	.....	.....	40	.....	.....	.....	.....	.....	.....	460,200	.....	840,960	466,223	.....
.....	No. 5.	24 "	15 "	7 "	50	85	1500	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	No. 3.	18 "	10 "	4 "	65	85	1800	50	278	121	1500	1400	4 in.	3 in.	216,000	Disch'rgs to top	394,200	.....	.....
.....	Boxes.	.....	.....	.....	.....	.....	.....	.....	.....	14	300	300	2 "	2 "	86,400	.....	.....	.....	.....
LAWSON MINE, S. E. Freeman.	Lifting Pump.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	8,000	.....	14,600	.....	.....
PATRICK MINE.	Lifting Pump.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	9,600	.....	17,520	.....	.....
JOHN MUIR & Son, East River Area.	Lifting Pump.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	9,600	.....	17,520	.....	.....

CAPE BRETON.

BRIDGEPORT, *January 7th, 1888.*

E. GILPIN, ESQ.,

Inspector of Mines:

DEAR SIR,—I beg leave to lay before you a report of my work as Deputy Inspector of Mines for the Island of Cape Breton, for the year ending December 31st, 1887.

SYDNEY MINES.

I have visited this mine eleven times during the year, viz., February 9th, March 10th, April 29th, May 26th, June 4th, July 20th, August 13th, September 20th, October 21st, November 11th, and December 10th. On all these visits I found the mine working in a satisfactory manner. South of the pit bottom an angle deep has been driven from the main South level, eastwardly through the waste workings, and a new landing laid down at the face of the present workings, for the purpose of shortening the haulage from that direction. The coal is drawn from this section over the road to the pit bottom by means of an engine and tail rope. About the 1st of September a leak of salt water was observed coming through the roof at the face of the South water level, in consequence of which the two levels and eleven rooms immediately below them were discontinued, and a leveling made in order to ascertain the thickness or cover from the leak to the bottom of the sea. The leveling was as follows: Commencing at the main shaft, (the shaft is six hundred and eighty-two feet deep to the bottom of the coal) a distance of eighty-nine chains, the leak proved to be two hundred and twenty-four feet higher than the pit bottom. The cliff above the sea is forty-two feet above or higher than tide level. The depth of water above the level and leak is thirty two feet, leaving three hundred and eighty-four feet of covering between the bottom of the sea and top of coal. I learned from Mr. Brown that this is about the centre of the channel, and the deepest water between Sydney Mines and Low Point. When the water was first discovered it was measured, and found to leak at the rate of one-half gallon per minute. It has been measured several times since, and found to run at exactly the same rate. There has been very little water pumped from the drowned district this season, owing to the great drouth and scarcity of surface water; however, there is ample room without this district for a larger number of workmen that is at present employed.

VICTORIA.

I made twelve official visits to this mine during the year. It worked steadily throughout 1887. A new lift of six hundred feet has been gained in line with the West slope. Levels have been driven

East and West from the bottom of the slope; the East levels are driven with a slight dip, so as to carry the water in that direction, and when driven in line with the centre slope a lodgment for the water will be made on the low side, and a headway will be driven to connect with the centre slope for the purpose of pumping the water therefrom. A balance is being driven from the new lift. The levels are being pushed on in the upper lift and balances driven. The timbering is good, and in general the Mines Regulation Act is strictly observed. On the bank, what is termed here a "Billy fairplay," has been erected for the purpose of weighing the slack coal taken from the pit and screens, which seems to give general satisfaction.

OLD BRIDGEPORT.

This mine has been inspected by me eight times, viz.: April 25th, May 25th, June 24th, July 27th, August 15th, September 22nd, October 29th, and December 6th. Above the pit bottom, towards the rise, a section of pillars have been successfully drawn. The roof in this mine is very good, and well adapted for the extraction of pillars. A portion of the roof has been taken down around and above the pit bottom for safety, and to make more height. The South of the pit bottom has been well secured with timber, and a stone pillar built. The cupola and furnace mentioned in my report for 1886 is not yet finished, but I am happy to report that Mr. Mitchell has turned his attention to it, and has men now working at the cupola, and informs me that he will have it completed by the first of next season.

RESERVE.

I have visited this mine thirteen times during the year. A new lift of five hundred feet has been gained from the bottom of the French slope. A number of pillars have been extracted from No. 1 and No. 4 lifts in the main slope. A new pump has been placed in the new lift which pumps all the water from the East side workings. The castings of this pump were made in South Sydney, at the new foundry, and the fitting and finishing done at the mines. It is of the following dimensions: Diameter of steam cylinder, fourteen inches; diameter of water cylinder, nine inches; length of stroke, twenty-four inches; number of valves, four; diameter of discharge, six inches; diameter of suction, six inches. This pump gives good satisfaction. A new cupola have been built over main furnace last spring. Mr. Routledge says it is intended to build a larger furnace there this winter, and another at the bottom of the West cupola.

INTERNATIONAL.

I have made several visits here through the season, viz.: April 22nd, May 23rd, June 24th, July 26th, August 10th, September 15th, October 5th, November 25th, and December 7th. All the coal mined in this colliery the past year was taken from the dip slant workings. A section has been laid off for mining in the North district of the dip slant. The rooms here are thirty feet wide, and the pillars eighteen.

The management here appear to approve of this method of working the coal, as they think a greater percentage of coal can be procured with less labour, and a smaller percentage of slack coal made. It is also their intention to reduce the pillars to a very small size in other parts of the mine, and work the coal in pannels. To the new pump mentioned in my last report is added eighteen hundred feet of six inch delivery pipe. They have also placed another screen on the bank in addition to the one mentioned in the Inspector's report for 1886.

LITTLE GLACE BAY.

I have made ten official visits to this mine during the year, viz.: March 16th, April 20th, May 4th, June 20th, July 4th, August 1st, September 7th, October 24th, November 22nd, and December 22nd. A number of pillars have been taken out from the rise West workings. Also a section of rooms have been widened from sixteen to twenty-four feet, leaving the pillars eight feet thick. This method of working is proving very profitable here, as a larger percentage of coal can be taken from the area where the roof is good. It also gives a greater advantage to the miners, as at the International and Gowrie there is less sheering to do. An angle roadway is being driven South of the pit from the main level, through the old rooms and pillars to the face of the workings, to shorten the haulage. It will be noticed by the table of air that there is a greater quantity of air circulated through the workings than formerly. The cause of this is, that, as the workings of the Sterling pit are driven through to those of the Harbour pit, it makes a larger area, and consequently more air.

CALEDONIA.

I have inspected this mine eleven times during the year, viz.: March 4th, April 9th, May 3rd, May 4th, June 18th, July 11th, August 17th, September 12th, October 25th, November 4th, and December 5th. Work was carried on here during the season in the usual manner. Coal mined East and West in the rise workings, and some pillars taken from the rise on the East side of the shaft. There was also a large portion of the coal shipped taken from the dip slant. On my first visit in May I found the air very dull in the West high workings; to this I drew the attention of the Underground Manager, he promised to attend to it at once. I visited again on the following day and found that this matter was more satisfactory. At the face of some of the workings in the dip a quantity of fire damp has been given off. I am happy to report that Mr. MacKeen has taken steps to render the gas harmless, by enlarging his return overcast to give more air, and by putting up additional doors and stoppings in order to carry the air closer to the working faces. The rolling stock on the surface has been largely added to, in order to ensure more speedy shipment of the coal raised.

ONTARIO.

I visited this mine eleven times. Work here was carried on in a similar manner to that of 1886. The only difference was that the coal this season was mined on the low side of the high level rooms facing

towards the dip; however, this method did not last long, as it was found too steep for the horses to haul the coal up, and too expensive to keep the water out. Mr. McPherson has given a contract of cleaning the water level from the shore, with the expectation of gaining a working grip for next season above water level.

BLOCK HOUSE.

I have made several visits to this mine during the year. There has not been much mining done here this season. What little coal was shipped was mined from the pillars to the rise of the South slope and above tide level. Care was taken to secure and timber the old workings whilst extracting the pillars.

GOWRIE.

I have made thirteen official visits to this mine during the year. I visited it twice in July and once every other month. On all my visits I found it working in its usual systematic manner. The dip workings continue to give good satisfaction. A large section of pillars have been drawn from the rise workings. The West high levels and rooms were continued. At the face of the main West level a fault was struck over a year ago. However the level was continued on its course through the stone about seventy yards. At a distance of twenty yards from where the fault was struck a bore hole was put down, and the seam pierced thirty-six feet below the level floor. In the boring the coal appeared hard and firm, and something thicker than at the face of the fault. In conclusion, I enclose you table of air measured at the different mines on each of my visits; also, table of accidents, three of which, as you shall see, I am sorry to say proved fatal.

I remain, your obedient servant,

PATRICK NEVILLE,

Deputy Inspector of Mines.

Report of No. of Cubic feet of Air measured in Cape Breton Collieries during 1887.

COLLIERIES.	January.	Feb.	March.	April.	May.	June.	July.	A ust.	Sept.	Oct.	Nov.	Dec.
Sydney Mines .....	.....	44,730	58,720	59,500	64,820	67,450	67,460	44,540	49,100	51,832	52,172	54,500
Victoria	31,180	33,180	26,460	31,500	28,000	21,000	28,140	27,510	26,960	35,400	39,600	45,684
Old Bridgeport .....	.....	.....	.....	6,000	7,650	3,520	5,080	5,500	5,000	5,420	.....	10,400
Reserve	28,900	29,000	30,000	22,800	36,557	28,080	28,100	31,000	30,000	35,040	40,600	43,000
International .....	.....	.....	.....	30,240	28,320	23,520	25,440	27,360	27,120	30,240	29,040	30,000
Little Glace Bay .....	.....	.....	10,000	15,840	12,960	23,520	23,525	16,380	22,266	20,000	47,460	45,000
Caledonia .....	.....	.....	25,000	24,500	14,000	25,590	39,270	39,690	38,250	40,000	39,989	40,950
Ontario	2,000	.....	.....	5,000	6,000	6,000	6,000	6,020	5,800	6,000	6,225	5,980
Block House .....	.....	.....	.....	.....	8,060	15,000	14,000	9,000	8,000	8,400	.....	10,000
Gowrie	25,000	28,630	28,500	35,380	36,000	27,880	33,500	40,200	20,000	40,000	38,000	35,685

Report of Accidents in Mines in Cape Breton for the year 1887.

Date.	Name of Mines.	Name.	Occupation.	REMARKS.
April 2.....	Gowrie.....	John McPhail	Miner.....	Collar bone broken by fall of coal.
" 4.....	Caledonia	John Morrison	do.	Leg broken by coal falling from face.
May 16.....	Gowrie.....	Donald I. Fergusson ..	Driver	Rib broken by fall of roof coal.
June 1.....	Old Bridgeport	Henry Way	Miner.....	Head badly bruised by fall of coal in cros-cut.
July 11.....	Gowrie.....	Murdock McDonald ..	do.	Thigh broken by fall of coal from face.
" 27.....	Caledonia	Neil J. McDonald	do.	Back and hip injured by fall of roof coal.
Sept. 12 ..	Reserve	William Marsh	do.	Leg broken by fall of stone from roof.
" 21.....	Sydney Mines..	Thomas Steele	Driver	Killed by fall of roof stone.
" "	do.	John Young	do.	Arm broken by fall of roof stone.
" "	do.	James Young	Miner.....	Chest injured by fall of roof stone.
" 28.....	Reserve	John McNeil	do.	Fatal. By fall of coal from pillar.
Oct. 5.....	Gowrie.....	John Fergusson	do.	do. By fall of roof coal.
" 25.....	Caledonia	John McQuarrie	do.	Slightly burned by gas.
Nov. 10 ...	Sydney Mines..	Donald McInnis	Fireman ..	do. do.
Dec. 28.....	Little Glace Bay	Hugh Gillis	Labourer ..	Leg broken by fall of coal from pillar.

GOLD.

The returns show that 173,4 '8 days labor were performed, 22,280 tons of quartz were crushed, yielding 21,211 ounces of gold during the year.

Although there is somewhat of a decrease in the gross amount of gold returned as compared to that of 1886, it is accounted for by the fact that the protracted drouth that commenced so early in the season prevented some of the regular mines from handling the usual amount of ore. The decrease in the amount handled by the older mines is more than double the total decrease of the whole industry, showing that the new properties have increased. There was a large amount of labor expended in developing new properties and re-opening old mines, putting a large amount of cash in circulation around the gold district. The expenditure of money for new machinery and mills was larger than for some years. The past year has been a profitable one, and there is a better feeling among gold miners as to the outlook of the industry for 1888. Exploring and prospecting, which were helped by the dry season, were largely entered into, and some promising discoveries were reported. Some systematic efforts have been made to handle low grade ores on a proper scale. As pointed out in former reports, these low grade properties are capable of supplying the bulk of the gold mining business. The expenditure of considerable sums of money on the roads to the mining districts has greatly benefitted the traffic at the mines, and made the transportation of machinery and heavy freight much easier.

GUYSBOROUGH COUNTY.

Stormont.—There has not been much done in this district except prospecting for new leads. Considerable interest was awakened by the discovery of a lead on Hurricane Island, in Isaac's Harbor, that showed rich quartz.

Wine Harbor.—Attention is being drawn to the leads of this district that formerly did well. The mill on the property of Judge Henry has been taken down and is being rebuilt on a new site. The property will likely be re-opened during the coming season, and may lead to the re-opening of the adjoining properties. This district is one of the few that have facilities for landing coal from vessels close to the mines.

Sherbrooke.—The work in this district has been on the low grade properties; 2,191 tons have been crushed, yielding 452 ounces, 18 pennyweights. The mills that have been running are the Miners, Goldenville, Pactolus, Melrose, Crow's Nest and Cummingier. The

scarcity of water caused a stoppage of work during the summer months. During the latter part of the year Jas. H. McDonald worked a considerable quantity of low grade ore from property of his own. John Williams & Co. worked on the Palmerston, New York and Hayden properties. Some work was done on the Dominion and Canada Co.'s properties. Mining work to a limited extent was carried on at different points in Goldenville by Messrs. McLean, Fraser, McKay, Purcell, Jack, and others. R. P. Fraser worked the Crow's Nest for a short time.

It is to be hoped that the efforts that have been made to develop the large bodies of low grade ore in the district will be successful, and low grade mining become as large and profitable an industry as the amount of ore to be seen in the district seems to warrant.

HALIFAX COUNTY.

Waverly.—This district shows favorable signs of being brought up again as a gold producer. Messrs. Wilson and Gue have been working on the American Hill, at the Old Dominion lead, and at the Taylor lead, for the purpose of testing the ore near the old workings, and opening up new portions of the leads. They have met with a good measure of success. It is expected that the DeWolf and Burkner properties will be re-opened next season.

Oldham.—J. E. Hardman has been carrying on the works on the Mayflower and Dunbrack leads. He bought out E. C. McDonnell, and is now carrying on the McDonnell works with his own. Some tributing has been done on areas in different parts of the district. This district has always given good returns for the money invested in it, and there is a large amount of ore untouched near at hand, giving promise of a good return. The returns show 2,599 oz. from 2,357 tons of quartz.

Lake Catcha District, Oxford Mines.—During the year the Oxford Company have worked steadily on the Battery leads, which, though very small, averaging only about one inch in thickness, have proved remarkably rich in coarse gold.

The Split lead has been re-discovered, and preparations are now being made to work it again. In July an angular was cut on the property, which gave handsome returns for the first few tons, but the gold did not extend to any depth. The mine yield during the year was 3,050 ozs. from 886 tons of crushing material, of which less than one-fourth was gold bearing ore. Total returns to date being 10,613 ozs. from 7,401 tons of ore.

Some prospecting has been done on adjoining properties, but nothing of note has been accomplished.

Tangier.—Strawberry Hill mine has been working on tribute. The Essex Company mine was re-opened and worked for a time. Some prospecting was done in the district. The interest of the past season has been centered at Mooselands, 12 miles distant by road from

old Tangier, and lying on the outskirts of the Tangier district, as originally proclaimed. Messrs. Dissoway, Murphy, Stemshorn, Irving, and others, took up areas on the Eastern side of the river at Moose-lands, and did a large amount of prospecting, resulting in the finding of several gold bearing leads of fair size and looking well. Irving and others have been tributing on the Humber property, principally on the Irving Furnace and Edwards leads, and in prospecting South of the mill found a new lead showing gold well. The road from Tangier has had a considerable amount of money expended on it by the Government, making it much improved.

Salmon River.—The Dufferin mine has carried on a large and remunerative business during the season, keeping the 38 stamp mill going almost continuously; 10,602 tons of ore have been crushed, yielding 3,258 ounces of gold. The wire-rope system has continued to give satisfaction. The workings in the East mine have developed large bodies of ore, the lode having in two of the large slopes a width of 23 feet. In the West mine the lode is from three to six feet in width. The vein is actually in two parts, only one dip having shown in the original outcrop, but showing the two dips between 50 and 100 feet in depth. There appears to be practically an unlimited supply of ore on the property. The total returns from this mine since it was opened show 27,814 ounces from 55,483 tons of quartz.

Fifteen Mile Stream.—The Egerton Company, under the superintendence of Mr. May, have been doing a steady business during the season. The mill and hoisting works of James Hudson were burnt during the season, causing a stoppage of his mine. Prospecting was greatly helped by the dry season, and a large amount of work was done, a number of new leads having been found and opened. Discoveries of gold in boulders in different places within a few miles of this camp, led to a considerable amount of exploration. This camp is still at a disadvantage for want of a good road.

Beaver Dam.—Mr. Yeadon has been carrying on his work steadily, and is doing well. A large amount of the work at this camp has been prospecting and development.

Killag.—Messrs. Stuart and Dixon have been working during the season. A road from the Sheet Harbor road to the camp was built during the summer by the Government and the parties interested in the district.

Lochaber.—John H. Anderson was busy during the season on the property of the Lochaber Company, and opened up a number of leads showing gold. There are a large number of leads in this district, and of good sizes for working.

Caribou, (Jennings).—The Lake Lode Co. have been pushing their work with good results. A new shaft was opened some distance West of the old pit to afford convenience in handling the ore from the West slopes. A new boiler and some new machinery has been added

to enlarge the power at the mine. Robert Wright has been superintending the development of some of the flat leads in the vicinity of the old Heatherington property, and has raised good ore. The owners have put up steam hoisting gear, and intend to put up a mill.

Caribou, (Moose River).—This district is a steady producer, although the amount of gold is small during some months. The outlook now is very encouraging. Mining is being carried on in three properties by Messrs. Tonquoy, Bruce and McGregor, respectively. Mr. Tonquoy has opened up a body of good ore, working the South lead with two dips, the Serpent lead and the North lead in one mine. He has built a dam to secure water power, and is building a 15-stamp mill. Being satisfied with the tests of the alluvial on his areas he intends to work over some thousand tons in the mill. Wm. Bruce is working the South lead on the areas adjoining Mr. Tonquoy. Mr. McGregor is working leads on the Moose River Gold Mining Co.'s property. His pits are down on the dips from the principal anticlinal fold in the district. The Caribou district shows 1,861 ounces from 2,689 tons of ore.

Explorers and prospectors have reported the finding of gold in a great number of places throughout the county.

LUNENBURG COUNTY.

Gold River.—The Gold River Mining Co. built a 20-stamp mill, driven by water, at the junction of the Branch Brook and the river. Some low grade ore was crushed. The dry season closed down the work, as the crushing, hoisting and pumping is done by water power. Prospecting was very brisk, and the discoveries of several new leads were reported.

Large numbers of areas were taken up for prospecting throughout this county, and considerable exploration done at different places.

HANTS COUNTY.

Renfrew.—Work has been carried on throughout the season at the Empress mine. The main shaft is down about 280 feet, and the drifts of the bottom level are about 400 feet long. This mine is a fine example of overhead stoping, and there is a large amount of ore blocked out in the Foundation lead. From the bottom level a crosscut has been driven South to the Hay lead, finding the lead of good size with a good working "hulk," making the work easy and cheap. This ore will be hoisted to surface through the main shaft on the Foundation lead. This quartz yields well in the mill, and a small force of men can supply quartz to keep the mill running steadily. A new pump has been put in the main shaft. The owners of the mine contemplate building a new mill of 20 stamps, and making other improvements in the working of the property. The Free claim property was worked for a short time, but was bought by E. C. McDonnell and associates who contemplate re-opening during next season.

Rawdon.—This district was one of the principal producers during the year. The properties known as the East and West mines, formerly owned by the McNaughton Co. and the Rawdon Co., were sold to an English Company. The McNaughton lead kept up in value, and has been steadily worked. The workings are down a little over 400 feet. A wide lead, giving four feet of ore, has been largely worked.

Mount Uniacke.—Several of the old properties, comprising a large number of areas, were bought by the British and Colonial Land Association, who are working them as low grade properties. They built a new 20-stamp crusher of the latest designs, with the best modern improvements. The mill also has setts of Frue Vanners for making concentrates, crackers, etc., and is driven by a fine Corliss engine.

Promising discoveries of gold-bearing lodes have been reported from several parts of this county; as South Uniacke and Central Rawdon.

QUEENS COUNTY.

Brookfield.—The Brookfield Mining Co. have been working steadily during the season, and getting good returns from the old lead. The new lead tested during the season is a low grade ore body, in some places 12 feet wide, and can be mined by hulking. To handle this ore will necessitate additional stamps.

Whiteburn.—This district has been a busy one from mining, prospecting and building. The success of the McGuire lead has stimulated the work on other properties. During the season three mines and three mills have been at work.

Malaga.—This new district has received a great deal of notice during the past season, and bids fair to become a large and important one. A large amount of money has been spent in developing different properties, and a road built to connect with the Brookfield road. A good number of promising leads are now in shape for regular mining work. It is expected to have a 20-stamp mill running by the early summer.

YARMOUTH COUNTY.

Carlton.—The Hale and Ross property was sold to Hatfield and Uhlman, of Carlton. The workings were carried down 100 feet deeper, and the slopes worked East to follow the good ore. Considerable prospecting was done in the district, and discoveries of gold-bearing leads reported.

Kemptville.—The Cowan Company resumed work during the summer. They turned their power at the engine house to operate pumps and machinery to develop the rich leads in the swamp. They resumed work in the Cowan mine proper during the early winter. The Kempt Company were busy all the season developing their property. They had the misfortune to lose their crusher and engine-house and hoisting works during the fall by a fire.

IRON.

In Cape Breton County there was some work done on the iron ore bed at East Bay, owned by E. T. Moseley, Esq. It is proposed to continue the work next season, with a view to its export. There was also a little work done on the George's River iron deposits. Discoveries of iron ore are reported from other points in the Island of Cape Breton. In Pictou County, the extensive deposits of this mineral, tested a number of years ago, have remained unworked, except at Bridgeville, where the Messrs. Grant have mined 172 tons from a large outcrop of brown hematite. The ore, which is of excellent quality, was purchased by the Steel Company of Canada.

Londonderry.—At this mine work has been continued at the East and West mines. There were 43,360 tons of ore mined, and 80 tons of anknite quarried. The Company made 18,510 tons of coke at their mines, and 14,391 tons of limestone were taken from McDonald's quarry at Brookfield for fluxes. A summary of the labor employed at these mines will be found at the end of the report.

COPPER.

There is little new to record under this head. The Eastern Development Company did some more work on their Coxheath property. A winze was sunk on the new North vein, which was proved to a considerable depth, and found to average eight feet. The cross cut on the 200 feet level was completed, and is 260 feet long; it showed three parallel veins of ore dipping North. A promising vein three feet wide is reported from Red Cape, Inverness County. A little prospecting was done on the copper ores owned by Mr. Eagar, and others at Pinkietown, Antigonish County. The present high prices of copper should afford a good opportunity for the Coxheath mine, as it appears to contain large ore bodies.

ANTIMONY.

The Rawdon mines have continued working, and discoveries of new veins are reported.

MANGANESE.

Mr. T. W. Stephens reports that 235 tons were mined by him at Tenny Cape. Small lots were taken from Cheverie, Maitland, etc. From Wolfville there were 385 tons exported, valued at \$2,233 per ton. At Pembroke there were — tons mined, and the Montreal Company extracted 40 tons from their Onslow mine. This Company expect to raise a much larger quantity next season. The values of the best ores run from 70 to 90 dollars a ton.

GYPSUM.

The total exports of Gypsum were 116,346 tons, compared with 123,753 tons in 1886. The market for this mineral is sought in the United States, where it is principally used for top-dressing, and the better qualities are ground for architectural purposes. It is to be regretted that there is not in this province an establishment similar to that at Hillsboro, in New Brunswick, capable of meeting our requirements for ground and manufactured plaster. The removal of the duty imposed on the manufactured article imported into the United States would permit the establishment of an important industry here, which would represent many times the value of the crude article exported.

THE MINES REGULATION ACT.

The Mines Regulation Act (Chapter seven of the Revised Statutes), was based on the Legislation on Mines passed in England a short time previously, and embodies the regulations for the inspection of both coal and metalliferous mines in Great Britain. The English Act has a long and interesting history, and was the outcome of philanthropy as well as of the desire of the miner for greater protection against the dangers of his calling. It also curiously illustrates the evolution of the theory of State interference, a form of socialism at once the most alluring, as well as perhaps the least objectionable. Mr. Boyd's useful work on "Coal Mine Inspection," gives in detail the gradual steps leading to the Mines Regulation Act of 1872, and the important Act in amendment thereof, passed in England this year, forms a logical supplement.

The final emancipation of English colliers from a state of practical servitude was not effected until the year 1799. From that date until the year 1842 the few Statutes that referred to colliers were framed in the interests of the coal owners. The first step upwards was the measure introduced by the late Lord Shaftesbury, to prevent the employment of women and young children underground. The necessity for interference may be judged of from the fact that it was a general rule to set children of seven or eight years of age to work underground.

The recurrence of colliery explosions and the complaints of the miners, as well as the attempts made to repeal the bill, led quickly to the formation of a public opinion that more legislation was required, and the report of the Commissions in 1846 showed clearly that a third power should intervene between masters and men, that of inspection. However, when Mr. Duncombe in 1847 introduced a bill to prohibit the use of naked lights or gunpowder in places where fire-damp was known to exist, it was rejected.

Three years later the accumulation of facts proved irresistible, and the period of enquiry, petition and discussion had closed for a time, by the appointment of inspectors under the Act of 1850. This step, however, did not settle the matter, and the loss of 138 lives in three weeks by explosions led to the appointment of a Commission to enquire into pit accidents, their cause and prevention. The report made in 1854 led to much discussion, and the Act passed in 1855 began to define more clearly limits of safety not to be overstepped by colliery managers.

The Act, by allowing the special rules, and by permitting imprisonment for the men and fines only for the managers, aroused much

irritation among the colliers, which was to a great extent removed by amendments made in 1860, when the bill was made perpetual, having been introduced only as a five year bill ten years previously.

The insertion of a clause allowing the colliers to appoint check weighers did not satisfactorily effect the abolition of abuses in estimating the coal mined, and further agitation was started, leading to the formation in 1863 of the Miners' National Association. For several years after the passage of the Act the mines were fortunately spared any specially terrible explosions, but the year 1866 witnessed the Oaks and other serious accidents. The evidence taken before the Commission then appointed was strong on the subject of the unsatisfactory estimation of the miners' coal, the education of boys, shorter hours, and sub-inspectors. The report of the Commission made July, 1867, was a decided step in advance, by increasing the limit of employment for boys underground from ten to twelve years of age, restricting the truck system and the use of gunpowder, and recommending increased inspection.

The bill introduced in 1869 embodied nearly all the recommendations of the Commission, but it was not pushed as a Government measure. The coal owners suggested many amendments, but the workmen's delegates considered that it failed to remedy many evils they had long complained of. There was much discussion on the bill, and the pressure of important political matters led to the Government withdrawing it. After some unsuccessful attempts to reconcile the conflicting interests the bill was introduced again in 1872, with several important amendments relating to ventilation, explosives, weighing, certificated managers, daily inspection by mine officials, etc.; all tending to effect the safeguards desired by the men. The bill was bitterly opposed by the masters, and to avoid the anticipated struggle conferences were held representing the Government, the masters and the men. A fairly agreeable compromise was effected and a report presented by the Conference Committee, but when the bill came before the house again it was found that very few of the compromise amendments had been added. Finally, after much discussion, the present Act received the Royal assent August 10th, 1872.

The Act, which is familiar in Nova Scotia under its translation to our Statutes, was an immense step in advance, but predictions were soon heard that it did not go far enough, and that the changed conditions of coal mining required more positive legislation on the subject of blasting, ventilation, lights and discipline. The occurrence of several terrible explosions pointed out that the strict observance of the act did not completely fill the list of safeguards against disasters.

The act was adapted to mines of moderate depth, and not gaseous, and laid down regulations which, not excessively severe on "safe" mines, were inadequate to those which could be classified as dangerous.

The use of gunpowder was permitted under conditions not very clearly interpreted, and safety lamps were not called for except under

conditions which were naturally suggested to managers of ordinary intelligence. The attention of the mining world was drawn to the part played by dust in augmenting and extending the flame of explosions, and the success of continental safety lamp makers, in devising lights much less assailable by currents of inflammable gas than the familiar Davy and Clanny, showed the English miner that he had long been at a disadvantage in combatting the gas difficulty. The reliability of the barometer for predicting by any appreciable period of time the exudation of gas from the solid coal, where it was confined at great pressure, was successfully questioned. All these points, with others of a more social character relating to inspection, weighing, etc., led to the appointment of the last commission, which has given a valuable report, directly affecting the latest English legislation, and forming a monument of careful and patient investigation.

The new mines' regulation Act, as recently assented to, presents numerous departures which cannot all be discussed here. I may, however, briefly refer to a few innovations, interesting to those engaged in our coal mines. Section 19 provides that when two or more parts of a mine are worked separately, each part may be deemed a separate mine. This, if interpreted to mean distinct egress and ingress, and ventilation, should tend to promote greater facility for inspection by mine officials, and more efficient ventilation.

Unwittingly or otherwise, the Act follows the lead of our Legislature in requiring certificated under-managers. The system proposed here has not yet been fully launched. The board of examiners, although desirous of establishing a standard of competency, but slightly inferior to that required by the ordinary board examination in England, found that apart from the practical experience, which was good enough, there was a deficiency among the candidates in the grasp of the principles underlying its application. The proper compensation of the broad principles of pneumatics, hydraulics, etc., is an essential element in the qualifications of the superior officials of a coal mine, who are liable at any moment to be called upon to promptly solve difficulties which are foreign to their past experience, or present under a fresh and unrecognized form, obstacles they have already seen overcome.

Another section requires that where loss of life or serious personal injury has immediately resulted from an explosion or accident, the place where it occurred shall be left untouched for at least three days after sending the statutory notice of the accident, unless visited by the Inspector before the expiration of that period. But this is not required if compliance would increase or continue a danger, or would impede the working of the mine.

This enactment will, no doubt, lead to many important and valuable reports by inspectors. Those concerned in the charge of a mine naturally desire to have the traces of any accident speedily removed, and their bias is not to present to outside view evidence which may be construed unfavourably to their practice. Questions may be raised as

to the meaning of the words "impede the working of the mine," but the interpretation in view of the aim of the section presumably would be to restrict it to the leading roads, air ways, inclines, etc., and not to apply it to working faces, etc.

Under the English Act any unfenced shaft, etc., which is within fifty yards of any road, etc., or on any open or unenclosed land, is deemed a public nuisance. Some such amendment would be found of advantage in our gold mining districts, where old shafts gape open in all directions; and power should be given to any local authority to compel attention to public safety.

Section 45 provides that whenever it appears necessary, a special investigation may be held into any accident or explosion, and, the persons constituting such court may summon witnesses, examine under oath, etc.

General rules 2 and 3 provide for dumb drifts, and for placing mechanical ventilators, so that they are insured from injury by an explosion. This arrangement would necessitate a change in the practice of placing blown down fans and ventilators of a similar class directly over shafts. Good mining practice has already pointed this out, and no interval of less than fifty yards from the mouth of a shaft can guarantee that ventilating machinery will not be injured. Under rule 8 another common sense provision is called for; that of not permitting the use of naked lights in cutting of coal in a return from a place where safety lamps are required. Rule 9 provides that whenever safety lamps are used they shall be of a pattern that may safely be carried against the ordinary air current of the mine. This provision sounds the death knell of the Davy lamp, familiar to the older generations of our colliers, and will lead to the speedy abandonment of lamps of the Clanny pattern. The Davy lamp, and its safer companion the "Geordie," coming after the days of candles, of fire balls, draft bags, etc., did good service, and in their turn have in great measure made way for the Clanny. This lamp has been largely used in Nova Scotia, and in the hands of an experienced man is safe, and affords good protection, but when served out to miners who are not trained to safety lamps, it is little safer than its predecessors. The Mueseler and Marsant lamps were, if I am correctly informed, first tried in Nova Scotia in the Acadia Colliery, and they are, I believe, about the best lamps procurable. Firemen object that they are not convenient for gas testing, but no safer or more satisfactory method of trying for gas can be found than one of these patent lamps, provided with a tube, and a small rubber bag, which squeezed empty by the hand is filled with the air, and the suspected mixture squeezed through the tube on to the flame of the lamp.

The shot firing clauses are made more stringent, and favor is shown toward explosives not capable of inflaming gas. As yet it does not appear that explosives have been produced absolutely incapable of igniting gas, and until some such explosive is found which can compete with gunpowder, it would almost appear that the precautions

surrounding the use of the latter should not be released under any circumstances.

Among the various compounds which have for several years been before the public in connection with this matter, *Carbonite* appears to have received the strongest endorsement. At a recent meeting of German Mine Managers at Dortmund, it was stated that it had been frequently fired in air containing 7 to 8 per cent. of fire damp, and filled with the most inflammable coal dust that could be procured, and in no case had any explosion occurred. It was also stated that under similar conditions gunpowder, blasting gelatine, and the various nitro-glycerine compounds, invariably caused an explosion. It was pointed out that in the experiments referred to it was used in charges more than equivalent to the customary charges of gunpowder. Should practical working under the conditions which experience has shown to lead to explosions with gunpowder, prove these advantages to be well founded, a great step will have been laid for sweeping legislation in the protection of life and property. With such an explosive available, the use of gunpowder should be prohibited in all mines showing gas steadily, even in small quantities, and in all broken workings. The watering of dusty rooms is also enjoined under certain conditions.

Rule 22 enjoins that whenever the men are required to do their own timbering, the necessary materials shall be placed conveniently to the working places, and the distance apart of sprags is regulated.

Rule 39, however, is the most startling, and one that would provoke much discussion in Nova Scotia. It provides that no person not now employed as a coal cutter shall cut coal by himself at the face of the workings, until he has had two years experience of such work under the supervision of skilled workmen, or has been employed for that length of time at or about the face of the workings of a mine. This is a decided step back towards the old principle of apprenticeship. Such a term is one of reproach in this country, and associated usually with some poor boy, whose legal guardians deem the tender mercies of some hardworking man the best means of developing the petted youthful inmates of a public charity. There can be no doubt that an apprenticeship makes a man a thorough workman, albeit narrow minded and slow. This clause was much discussed, many representing the employers as saying that the earlier a boy entered the mine the better miner he became as he grew up, and that the schools diverted many into other paths of life more alluring than underground toil.

There can be no question that too often in this Province men are permitted to cut coal before they have acquired a proper knowledge of their occupation, and its enforced caution against gas, falls of coal of roof, slips, etc. I have no doubt that some such provision as this would reduce the number of accidents at the face in our mines, and tend to increase the number of steady and careful miners.

LIST OF MINERAL LEASES (OTHER THAN GOLD.)

No.	Lessee.	District.	Area Square Miles.
COPPER.			
ANTIGONISH COUNTY.			
2	Ross, McKay et al .....	.....	1
COLCHESTER COUNTY.			
	Moir, Wm. C., et al	Tatamagouche	10½
CAPE BRETON COUNTY.			
105	Burchell, J. E .....	.....	1
106	Burchell, G. L., et al .....	.....	1
95	Coxheath Mining Co .....	.....	1
104	McKenzie, H. R., et al .....	.....	1
94	McKenzie & McKim .....	.....	1
HALIFAX COUNTY.			
1	McClure, Chas. F	Gay's River	1
IRON.			
PICTOU COUNTY.			
44	Hudson, James	East River	1
43	"	"	1
Total area under lease			19½ square miles.

LIST OF MINERAL LEASES (OTHER THAN GOLD.)—Continued.

No.	Lessee.	District.	Area Square Miles.
IRON.—(CONTINUED)			
CAPE BRETON COUNTY.			
86	Brookman, S., et al	N. Side East Bay	1
91	Brookman, S. L.	East Bay	1
93	Brookman, S., et al	" "	1
102	C. L. Ingraham	" "	1
103	A. McKenzie et al	" "	1
92	Matheson, D., et al	" "	1
84	Protheroe, Pryse	Cow Bay	1
16	Inverness C. I. & R. Co	Whycocomagh	1
INVERNESS COUNTY.			
Total area: under lease			
			27½ square miles.

LIST OF COAL LEASES.

No.	Lessee.	Colliery.	Area Sq. Miles.	Working.	Agent and Manager.	Postal Address.
21	Bligh, James, et al	CUMBERLAND CO.	1	.....	John Moffatt	River Hebert.
47	Boston C. M. Co. . . . .	.....	1	Working.	Jas. Baird	Maccan.
54	Cumberland C. M. Co.	Chignecto	4	.....	R. G. Leckie . . } W. Hall	Springhill.
12	Cumberland R'y & Coal Co.	Springhill	9	Working.	P. McNaughton . .	Joggins.
6, 7, 8, 44, 52, 55	Joggins C. M. Association . .	Joggins	2	Working.	.....	.....
17	Joggins C. M. Co. . . . .	.....	2	.....	.....	.....
5	Lawson C. M. Co.	Maccan	1	.....	.....	.....
51, 53	Milner, Christopher . . . . .	.....	2	.....	.....	.....
1, 2, 3, 4	New York & Acadia Co.	Scotia	4	Working.	W. Patrick	Maccan.
	W. Patrick et al.	Patrick	1	Working.	J. L. Hewson	Maccan.
	Saltsprings Coal Co. . . . .	.....	1	.....	M. Dunlop	Oxford.
16	Minudie M. & T. Co. . . . .	.....	1	Working.	J. S. Hickman . .	River Hebert.
22, 23, 28, 29, 30	Styles Mining Co. (Ltd.) . . . .	.....	5	.....	.....	Amherst.
9	Victoria Coal Mining Co. . . . .	.....	2	.....	.....	.....
			39			

LIST OF COAL LEASES.—(CONTINUED.)

No.	Lessee.	Colliery.	Area Sq. Miles.	Working.	Agent and Manager.	Postal Address.
		PICTOU CO.				
1	Acadia Coal Co.....	Fraser.....	1	Working.	{ H. S. Poole	Stellarton.
3	"	Acadia	1	"	{ J. Maxwell	Westville.
42	"	Pictou.....	4	.....	{ T. Turnbull.....	Vale Colliery.
23	"	Vale	3	Working.	{ J. Douglas ..	Albion Colliery.
	"	Albion	4	Working.	{ J. Dunbar ..	
10	Gray, B. G., et al .....	.....	1			
11	Haliburton, R. G., et al .....	.....	1			
13, 14	Intercolonial Coal Co .....	.....	2			
12	"	Drummond	1	Working.	Robert Simpson..	Westville.
6	Montreal & New Glasgow ..	.....	1			
24	Richey, M. H. ....	.....	1			
45	B. G. Gray.....	.....	2	Working.	Muir & Sons....	New Glasgow.
			22			
		CAPE BRETON CO.				
3	Archibald, Blowers	Gowrie	1	Working.	{ Archibald & Co.	North Sydney.
2	Archibald, Thomas D	"	1		{ Chas. Archibald.	Cow Bay.
5, 28	C. Belloni	Blockhouse	2	Working.	R. Belloni	Cow Bay.
29	" (sea area).....	.....	1			

15	Caledonia C. & R. Co	Caledonia	1	Working.	David McKeen ..	Glace Bay.
31	" (sea area) ..	.....	1			
8, 9	Halifax Coal & Iron Co	Ontario	1½	Working.	<i>Jno. Sutherland.</i>	Pt. Caledonia.
	General Mining Association..	Bridgeport.....	2		{ Rich. H. Brown.	Sydney Mines.
27	" " ..	Sydney	18	Working.	{ Cunard & Morr'w	Halifax.
	" " (sea area) ..	"	4		{ H. Mitchell	Bridgeport.
38, 39	Low Point, Barasois, and	Lingan	13	Working.	<i>Donald Lynk....</i>	Low Point.
10, 21	Lingan Mining Co., (Ltd) ..	"	10			
	Gibson, John, et al .....	.....	2			
4, 12, 16	Glace Bay Mining Co	Glace Bay	3	Working.	{ E. P. Archbold ..	Halifax.
6, 13, 18, 19, 30	International Coal Co., (Ltd).	International.....	5	Working.	{ <i>Chas. Rigby....</i>	Lt. Glace Bay.
66	Merchants' Bank of Canada.	Gardener	2		<i>P. Johnstone....</i>	Bridgeport.
52, 53	McLeod, Hugh .....	.....	2			
40, 41, 42	Ross, H. E., et al .....	.....	3			
79	Ross, W. J., et al, (sea area).	.....	1			
32	Weatherbe & Hendry, (sea area)	.....	3			
23, 25, 70	Sydney & Louisburg Coal &	.....			
14, 24	R. R. Co., (Ltd)	Schooner Pond ..	10	Working.	{ F. C. Kimber ..	Sydney.
49	" " " " ..	Reserve				
64, 65, 68	" " " " ..	Lorway				
69	" " " " ..	Emery				
54 to 63	Sydney C. M. Co. (sea areas).	.....	10			
67	Weatherbe & Kirby .....	.....	1			
78	Weatherbe, R. L., (sea area).	.....	5			
96, 97, 98 99, 100	Low Point, Barasois and	.....	5			
	Lingan Mining Co., Ltd ..	.....	2	Working.	D. Lynk.....	Low Point.
	" (sea areas)	.....			
			112½			

LIST OF COAL LEASES.—(CONTINUED.)

No.	Lessee.	Colliery.	Area Sq. Miles.	Working.	Agent and <i>Manager</i> .	Postal Address.
7, 12	Inverness C. I. & R. C.	INVERNESS CO.	2		Alex. Wright....	Moncton.
13	McGregor, J. D.	.....	3			
4	Richey, M. H., et al	Port Hood	1			
11	Ross, W. J.	.....	1			
6	Ross, H. E., et al, (<i>sea area</i>)..	Broad Cove	1			
10	Tremaine, E. D., (<i>sea area</i>)..	.....	1			
			<u>9</u>			
2	Kenny, T. E	VICTORIA CO.	3			
3, 4, 5	Ross, Wm	New Campbellton Black Rock	5			
			<u>8</u>			
Total area under lease.....			190½ square miles.			

TABLE A.—COAL TRADE BY COUNTIES.

	CUMBERLAND.		PICTOU.		CAPE BRETON.		OTHER COUNTIES.		TOTAL.	
	Raised.	Sold.	Raised.	Sold.	Raised.	Sold.	Raised.	Sold.	Raised.	Sold.
1st Quarter	100,635	92,091	44,762	39,499	60,807	7,224	.....	.....	206,204	138,814
2nd Quarter	125,786	118,006	77,797	63,772	220,381	194,396	.....	.....	423,964	376,174
3rd Quarter	130,893	123,354	130,324	120,172	298,140	318,117	.....	.....	559,357	561,643
4th Quarter	142,158	131,697	132,023	115,591	207,032	195,705	100	60	481,313	443,053
Total	499,472	465,148	384,906	339,034	786,360	715,442	100	60	1,670,838	1,519,684
1886	448,621	416,266	414,805	369,026	638,990	588,191	195	183	1,502,611	1,373,666
1885	368,923	340,535	432,819	396,000	548,478	517,975	.....	.....	1,350,220	1,254,510
1884	279,964	258,405	511,193	464,181	598,156	539,064	.....	.....	1,389,295	1,261,650

TABLE B.—COAL TRADE BY COUNTIES.

	CUMBERLAND.			PICTOU.			CAPE BRETON.			Other Counties.			TOTALS.			Grand Total.
	Round.	Slack.	Run of Mine.	Round.	Slack.	Run of Mine.	Round.	Slack.	Run of Mine.	Round.	Slack.	Run of Mine.	Round.	Slack.	Run of Mine.	
Nova Scotia Land Sales	25,509	31,727	33,910	100,332	66,916	....	2,965	4,586	....	60	....	....	128,866	103,229	33,910	266,005
Sea borne....	64	125	.....	15,267	4,547	....	160,373	20,857	2,226	.....	....	....	175,704	25,529	2,226	203,459
Nova Scotia, total....	25,573	31,852	33,910	115,599	71,463	....	163,338	25,443	.....	60	....	....	304,570	128,758	36,136	469,464
New Brunswick	26,620	21,659	82,026	22,236	3,506	....	30,012	452	.....	.....	.....	.....	78,868	25,617	82,026	186,511
Newfoundland .....	.....	.....	.....	730	.....	....	78,735	2,346	242	.....	.....	....	79,465	2,346	242	82,053
P. E. Island .....	.....	.....	.....	8,598	20,205	....	14,836	6,976	.....	.....	.....	....	23,434	27,181	.....	50,615
Quebec	3,751	22,697	175,673	92,300	3,010	....	279,935	49,294	24,198	.....	.....	....	375,986	75,001	199,871	650,858
West Indies .....	.....	.....	.....	.....	.....	....	5,858	282	.....	.....	.....	....	5,858	282	....	6,140
United States	105	5,670	35,612	602	767	....	1,851	29,285	.....	.....	.....	....	2,558	35,722	35,612	73,892
Other Countries .....	.....	.....	.....	.....	18	....	133	.....	.....	.....	.....	....	133	18	.....	151
Total	56,049	81,878	327,221	240,065	98,969	....	574,698	114,078	26,666	60	....	....	870,872	294,925	353,887	1,519,684
1886	70,102	91,188	254,976	268,386	100,640	....	450,335	87,510	50,346	183	....	....	789,006	279,338	305,322	1,373,666
1885	81,390	80,901	178,244	289,909	103,960	2131	407,079	62,815	48,081	.....	.....	....	778,378	247,676	228,456	1,254,510
1884	155,999	102,406	.....	330,309	133,872	....	459,210	70,845	.....	.....	.....	....	945,518	316,132	.....	1,261,650

COAL.—SALES.

Markets.	1st Quarter.	2nd Quarter.	3rd Quarter.	4th Quarter.	Year 1887.	Year 1886.
Nova Scotia:						
Land Sales. .	52,877	54,498	67,024	91,606	266,005	271,384
Sea borne ..	8,120	42,839	70,110	82,390	203,459	188,853
N. S.—Total ..	60,997	97,337	137,134	173,996	469,464	460,237
N. Brunswick .	28,647	36,877	51,058	69,929	186,511	175,918
Newfoundland.	841	12,995	39,177	29,040	82,053	71,476
P. E. Island. . .	.....	10,717	23,151	16,747	50,615	49,168
Quebec	47,568	201,238	277,041	125,011	650,858	538,762
West Indies ..	761	1,347	1,434	2,598	6,140	11,364
United States. .	.....	15,663	32,648	25,581	73,892	66,003
Other countries	.....	.....	.....	151	151	738
Total	138,814	376,174	561,643	443,053	1,519,684	1,373,666
1886 ..	153,054	356,340	527,654	336,618	1,373,666	
1885 ..	125,351	309,513	510,787	308,859	1,254,510	

COAL.—GENERAL STATEMENT.

1887.	Produce.	Sold.	Colliery Consumption.
1st Quarter tons	206,204	138,814	31,243
2nd "	423,964	376,174	42,586
3rd "	559,357	561,643	30,389
4th "	481,313	443,053	35,559
Total.....	1,670,838	1,519,684	139,777
1886.	1,502,611	1,372,656	142,421
1885.	1,352,205	1,254,510	127,624

COAL PRODUCE OF NOVA SCOTIA DURING THE YEAR ENDED DECEMBER 31ST, 1887.

COLLIERIES.	SALES.				COLLIERY CONSUMPTION.		
	Produce.	Round.	Slack.	Run of Mine.	Total.	Engines.	Workmen.
CUMBERLAND Co. :							
Chignecto.....	16,480	7,237	3,131	2,160	12,528	3,708	215
Joggins.....	16,649	10,415	2,971	.....	13,386	3,122	1,013
Lawson.....	120	90	10	.....	100	.....	.....
Patrick.....	.....	.....	.....	.....	.....	.....	.....
Spring Hill.....	466,223	38,307	75,766	325,061	439,134	21,363	5,718
Pictou Co. :							
Acadia.....	230,611	129,663	64,532	.....	194,195	34,558	4,154
Barton.....	325	150	11	.....	161	.....	.....
East River.....	1,145	1,200	515	.....	1,715	206	174
Intercolonial.....	152,825	109,052	33,911	.....	142,963	5,565	2,877
CAPE BRETON Co. :							
Blockhouse.....	7,676	7,522	.....	.....	7,522	.....	154
Bridgeport.....	19,265	16,688	1,326	.....	18,014	115	110
Caledonia.....	108,144	72,293	29,797	.....	102,090	1,494	1,259
Franklyn.....	5,422	4,219	1,203	.....	5,422	.....	.....
Glace Bay.....	79,516	66,778	8,864	.....	75,642	3,109	4,094
Gowrie.....	128,477	96,413	23,341	.....	119,754	2,968	1,601
International.....	109,404	58,712	18,403	25,370	102,485	2,009	2,994
Ontario.....	7,768	7,426	21	.....	7,447	276	125
Reserve.....	88,849	66,142	10,063	.....	76,205	5,957	3,573
Sydney.....	170,782	129,950	15,260	.....	145,210	15,618	7,772
Victoria.....	61,057	48,555	5,800	1,296	55,651	2,773	2,103
INVERNESS Co. :							
Mabou.....	100	60	.....	.....	60	.....	.....
Total.....	1,670,838	870,872	294,925	353,887	1,519,684	102,841	37,936

COLLIERY CONSTRUCTION ACCOUNT, 1887.

COLLIERIES.	Shafts.	Slopes.	Adits.	Machinery.	Colliery Buildings.	Dwellings	Surface Works.	Railways.	Wharves.	Prospecting.	Totals.
CUMBERLAND Co.											
Chignecto	\$ 200 00	.....	\$ 750 00	.....	.....	.....	.....	.....	\$ 950 00
Joggins	2900 00	\$5259 00	\$2360 00	\$716 00	.....	.....	\$ 19815 00
Springhill	\$ 981 00	.....	\$7600 00	.....	.....	.....	.....	.....	.....	.....
Pictou Co.											
Acadia	338 00	.....	721 00	187 00	.....	285 00	.....	.....	.....	1531 00
Intercolonial	8367 00	584 00	.....	.....	.....	.....	\$329 00	9280 00
Barton
East River	\$40 00	300 00	.....	200 00	150 00	.....	240 00	.....	.....	.....	930 00
CAPE BRETON Co.											
Bridgeport
Blockhouse
Caledonia	1830 00	.....	.....	.....	.....	.....	.....	.....	1830 00
Franklyn
Glace Bay
Gowrie	1156 00	.....	300 00	.....	.....	.....	.....	.....	1456 00
International
Ontario	85 00	.....	.....	.....	80 00	.....	.....	.....	198 00
Reserve	753 00	829 00	.....	137 00	70 00	.....	.....	\$33 00	.....	1789 00
Sydney	2062 00	.....	338 00	.....	.....	.....	.....	2400 00
Victoria	1035 00	7478 00	.....	.....	.....	.....	.....	.....	.....	8513 00
INVERNESS Co.											
Mabou	34 00	.....	.....	.....	34 00
	\$40 00	\$3407 00	\$11578 00	\$18950 00	\$5008 00	\$5658 00	\$3007 00	\$716 00	\$33 00	\$329 00	\$48726 00

Statement of the Classes and Number of Men employed, etc., at each Colliery during the year ended December 31st, 1887.

COLLIERIES.	UNDERGROUND.				ABOVE GROUND.				CONSTRUCTION.				TOTAL.		Average num-ber of tons per Cutter.	Average quan-tity raised per day.	HORSES.		Days.	
	Skilled Labor.	Laborers.	Boys.	Days' Labor.	Skilled Labor.	Laborers.	Boys.	Days' Labor.	Skilled Labor.	Laborers.	Boys.	Days' Labor.	Persons.	Days' Labor.						
CUMBERLAND Co.																				
Chignecto	20	9	5	8224	2	9	3	4289	...	...	...	...	48	12513	824	2.9	58	1	283
Joggins	32	7	8	8643	4	21	6	7103	4	...	...	283	82	16029	520	2.5	81	2	204
Springhill	506	237	142	248033	80	130	19	62651	9	10	...	5227	1133	315911	881	3.2	1622	17	275	
Pictou Co.																				
Acadia	263	210	81	120382	66	133	20	62250	3	...	...	132	776	182764	876	5.2	1389	16	166
East River	5	1	...	1395	1	...	...	330	1	...	...	250	8	1975	229	1.1	5.6	...	201
Intercolonial	129	62	69	74496	32	56	9	30733	1	1	...	258	359	105487	1186	4.2	543	7	281	
Barton	2	1	...	187	...	...	...	...	...	...	...	...	3	187	162	1.3	2.7	1	117
CAPE BRETON Co.																				
Block House	9	3	...	1646	8	...	...	1613	...	...	...	...	20	3259	852	5.2	47	2	163
Bridgeport	19	...	2	6090	2	3	1	1671	...	...	...	...	27	7761	1013	5.6	107	2	179
Caledonia	115	10	32	30137	17	31	12	14579	4	...	...	1157	221	45873	590	3.2	940	7	183
Franklyn	7	...	2	2315	...	...	...	...	...	...	...	...	10	2589	774	3.2	22	...	241
Glace Bay	101	9	15	21910	23	24	4	12737	...	...	...	...	176	34647	787	4.2	425	4	187
Gowrie	131	14	46	38674	21	52	19	22782	...	...	...	...	283	61456	980	5.6	738	9	174
International	109	29	33	13951	32	33	12	5931	...	...	...	...	248	19882	1003	(?) 9.4	1032(?)	6	106
Ontario	20	2	3	3827	3	2	1	1558	...	...	...	...	31	5385	388	2.6	52	4	147
Reserve	97	15	30	27395	17	18	5	9653	2	...	2	1361	186	38409	915	4.7	425	6	209	
Sydney	230	40	108	91624	57	85	35	50583	7	...	1	2382	563	144589	712	3.0	708	11	241	
Victoria	87	31	10	34880	7	38	7	16083	...	...	...	...	180	50963	701	2.3	240	4	296
INVERNESS Co.																				
Mabou	3	...	...	15	...	...	...	...	...	...	...	...	3	15	...	...	...	...	...
Total	1885	680	586	733824	372	635	154	304820	31	11	3	11050	4367	1049694	101	271	3653

COAL.

NOVA SCOTIA EXPORTED TO THE UNITED STATES.

Years.	Tons.	Duty.	Years.	Tons.	Duty.
1850	118,173	24 ad.	1869	257,485	\$1 25
1851	116,274	"	1870	168,180	"
1852	87,542	"	1871	165,431	"
1853	120,764	"	1872	154,092	75
1854	139,125	Free	1873	264,760	"
1855	103,222	"	1874	138,335	"
1856	126,152	"	1875	89,746	"
1857	123,335	"	1876	71,634	"
1858	186,743	"	1877	118,216	"
1859	122,720	"	1878	88,495	"
1860	149,289	"	1879	51,641	"
1861	204,457	"	1880	123,423	"
1862	192,612	"	1881	113,728	"
1863	282,775	"	1882	99,302	"
1864	347,594	"	1883	102,755	"
1865	465,194	"	1884	64,515	"
1866	404,252	"	1885	34,483	"
1867	338,492	\$1 25	1886	66,003	"
1868	228,132	"	1887	73,892	"

NOTE.—The quantities given for the years 1850 to 1872 are on the authority of the Board of Trade, Philadelphia, and are probably under-estimated.

Nova Scotia Coal Sales, from 1785 to 1887 (inclusive.)

Year.	Sales.	Total.	Year.	Sales.	Total.	
1785	1,668	14,349	1841	148,298	Forw'd 1,208,177	
1786	2,000		1842	129,708		
1787	10,681		1843	105,161		
1788			1844	108,482		
1789			1845	150,674		
1790			1846	147,506		
1791	2,670		1847	201,650		1,533,798
1792	2,143		1848	187,643		
1793	1,926		1849	174,592		
1794	4,405		1850	180,084		
1795	5,320	1851	153,499			
1796	5,249	1852	189,076			
1797	6,039	1853	217,416			
1798	5,948	1854	234,812			
1799	8,947	1855	238,215			
1800	8,401	1856	253,492	2,399,829		
1801	5,775	1857	294,198			
1802	7,769	1858	226,725			
1803	6,601	1859	270,293			
1804	5,976	1860	322,593			
1805	10,130	1861	326,429			
1806	4,938	1862	395,637			
1807	5,119	1863	429,351			
1808	6,616	1864	576,935			
1809	8,919	1865	635,586			
1810	8,609	1866	558,520	4,927,339		
1811	8,516	1867	471,185			
1812	9,570	1868	453,624			
1813	9,744	1869	511,795			
1814	9,866	1870	568,277			
1815	9,336	1871	596,418			
1816	8,619	1872	785,914			
1817	9,284	1873	881,106			
1818	7,920	1874	749,127			
1819	8,692	1875	706,795			
1820	9,980	1876	634,207	7,377,428		
1821	11,388	1877	697,065			
1822	7,512	1878	693,511			
1823	27,000	1879	688,628			
1824		1880	954,659			
1825		1881	1,035,014			
1826		1882	1,250,179			
1827	12,149	1883	1,297,523			
1828	20,967	1884	1,261,650			
1829	21,935	1885	1,254,510			
1830	27,269	1886	1,373,666			
1831	37,170	1887	1,519,684	8,992,226		
1832	50,369	Total....			26,438,797	
1833	64,743					
1834	50,813					
1835	56,434					
1836	107,593					
1837	118,942					
1838	106,730					
1839	145,962					
1840	101,198					
	839,981					

SUMMARY.

1785 to 1790	14,349	1831 to 1840	839,981
1791 to 1800	51,048	1841 to 1850	1,533,798
1801 to 1810	70,452	1851 to 1860	2,399,829
1811 to 1820	91,527	1861 to 1870	4,927,339
1821 to 1830	140,820	1871 to 1880	7,377,428

GOLD—GENERAL STATEMENT FOR THE YEAR 1887.

Shewing the number of Mines, Days' Labor performed, quantities of Quartz crushed, yield of Gold, &c., for the year ended Dec. 31st, 1887.

DISTRICTS.	Number of Mines.	Days' Labor.	Mills.	Steam Power.	Water Power.	Tons of Quartz Crushed.	Yield per Ton.		Maxim. Yield per Ton.		Total Yield of Gold.	
							Oz.	Dwt. Gr.	Oz.	Dwt. Gr.	Oz.	Dwt. Gr.
Caribou	3	7832	1	1	.....	2689	0	13	0	18	1861	9 22
Oldham	2	11606	1	.....	1	2357	1	2	2	10	2599	7 9
Renfrew	1	5098	2	.....	2	1234	0	12	0	17	750	4 14
Sherbrooke	4	9575	.....	.....	.....	2413	0	4	0	18	585	3 5
Stormont	2	2964	1	1	.....	663	0	8	1	5	293	15 22
Tangier	2	6319	2	2	.....	738	0	8	1	10	311	10 13
Uniacke	1	10503	3	3	.....	689	0	3	0	4	107	3 1
Salmon River	1	33774	1	.....	1	10602	0	6	0	9	3258	0 0
Brookfield	1	13075	1	.....	1	1691	0	16	1	3	1418	1 15
Whiteburn	2	7599	3	3	.....	1094	2	2	6	2	2305	12 13
Lake Catcha	2	12116	2	2	.....	601	4	18	7	5	2959	4 0
Rawdon	2	31560	1	1	.....	5302	0	13	1	7	3507	13 8
Fifteen Mile Stream..	1	4920	1	1	.....	829	0	9	1	5	398	5 0
Unproclaimed, &c.....		16487	5	2	3	1378	0	12	1	9	856	6 16
Totals	29	173448	24	16	8	22280	Av. 0	19	6	2	21211	17 18

MONTHLY STATEMENT FROM EACH GOLD DISTRICT.

MONTH.	CARIBOU.						OLDHAM.							
	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Grs.	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Grs.
January .....	.....	.....	.....	324	237	13	2	2	605	24	56	111	3	11
February .....	.....	.....	.....	365	151	10	15	2	706	28	64	158	17	0
March .....	.....	.....	.....	329	243	8	17	2	854	34	267	221	9	0
April	2	362	14	262	241	1	16	2	742	30	226	108	14	0
May.....	2	410	16	258	102	7	15	2	853	34	254	168	0	0
June	2	408	16	97	87	13	0	2	971	40	236	248	2	0
July	2	707	28	54	18	17	5	3	1116	45	203	137	4	0
August	2	617	24	91	55	8	15	3	872	35	.....	.....	..	..
September	2	762	30	194	161	15	22	3	1066	42	294	367	17	0
October	4	1360	54	331	283	5	4	2	1201	48	220	552	0	22
November	4	1482	59	70	48	6	19	2	1298	52	245	311	0	0
December	4	1724	70	314	230	1	12	2	1322	53	292	215	0	0
Totals.....	3	7832	.....	2689	1861	9	22	2	11606	.....	2357	2599	7	9

MONTHLY STATEMENT FROM EACH GOLD DISTRICT.—(CONTINUED.)

MONTH.	RENFREW.						SHERBROOKE.							
	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Grs.	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Grs.
January	1	332	13	122	107	16	0	5	787	31	.....	....	..	..
February	1	381	15	41	36	0	0	4	888	31	56	31	14	0
March	1	237	9	.....	....	..	..	3	190	8	45	41	4	14
April	1	401	16	101	63	0	0	2	182	7	.....	....	..	..
May	1	415	16	110	89	0	0	3	442	18	76	16	5	0
June	1	368	14	126	54	16	6	3	650	26	77	16	7	0
July	1	277	11	125	52	0	8	3	780	31	.....	....	..	..
August	1	309	12	46	33	10	0	3	740	30	240	....	..	..
September	1	258	10	.....	....	..	..	5	1092	43	637	124	19	0
October	1	700	28	327	209	14	0	5	1092	43	350	94	13	0
November	1	710	28	96	36	12	0	6	1274	51	555	142	15	0
December	1	710	28	140	67	16	0	6	1458	58	377	117	5	15
Totals.....	1	5098	.....	1234	750	4	14	4	9575	.....	2413	585	3	5

MONTHLY STATEMENT FROM EACH GOLD DISTRICT.—(CONTINUED.)

MONTH.	STORMONT.						TANGIER.							
	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Grs.	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Grs.
January	1	102	4	288	92	5	15	1	128	5	25	16	17	12
February	1	90	4	50	21	8	15	2	261	10	24	36	0	0
March	1	79	3	42	10	5	0	2	670	26	30	12	4	12
April	2	168	6	48	15	5	0	2	517	21	18	8	1	0
May	2	228	9	13	5	17	12	2	1536	61	21	15	5	0
June	2	360	10	20	20	7	0	2	1483	55	124	46	4	6
July	1	80	3	.....	....	..	..	2	1027	41	154	78	7	6
August	2	532	21	11	13	18	0	2	697	28	174	21	17	1
September	2	572	23	79	78	4	16	2	.....	...	50	28	18	0
October	2	446	17	45	14	3	12	.....	.....	.....	118	47	16	0
November	1	180	7	67	22	1	0	.....	.....	.....	.....	....	..	..
December	1	127	5	.....	....	..	..	.....	.....	.....	.....	....	..	..
Totals	2	2964	.....	663	293	15	22	2	6319	.....	738	311	10	13

MONTHLY STATEMENT FROM EACH GOLD DISTRICT.—(CONTINUED.)

MONTH.	UNIACKE.							SALMON RIVER.						
	No. of Mines.	Days' Work.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Gr.	No. of Mines.	Days' Work.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Gr.
January	1	257	10	65	13	7	..	1	3076	123	827	262	..	..
February	1	240	9	61	12	11	..	1	3104	124	767	218	..	..
March	1	109	4	55	7	12	..	1	3032	121	1032	248	..	..
April	1	8	....	.....	..	..	..	1	2998	119	844	264	..	..
May	1	403	16	.....	..	..	..	1	3267	131	986	222	..	..
June	1	986	39	.....	..	..	..	1	2976	119	864	157	..	..
July	1	1282	51	.....	..	..	..	1	2886	114	910	222	..	..
August	1	1505	60	.....	..	..	..	1	3044	121	915	353	..	..
September	1	1511	60	.....	..	..	..	1	2914	116	910	319	..	..
October	1	1295	52	400	49	11	..	1	2174	87	800	255	..	..
November	1	1632	65	50	11	14	15	1	2160	86	825	321	..	..
December	1	1275	51	58	12	7	10	1	2153	86	922	417	..	..
Totals.....	1	10503	....	689	107	3	1	1	33774	....	10602	3258	..	..

MONTHLY STATEMENT FROM EACH GOLD DISTRICT.—(CONTINUED.)

MONTH.	BROOKFIELD.							WHITEBURN.						
	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Gr.	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Grs.
January	1	1250	50	195	124	17	..	2	1103	44	35	124	0	0
February	1	965	39	277	204	13	..	2	832	33	129	243	6	0
March	1	901	36	187	223	17	..	2	820	33	94	236	5	5
April	1	1954	78	102	116	6	..	1	288	11	21	128	10	0
May.....	1	1919	76	155	111	3	15	1	294	11	20	111	3	15
June	1	2309	92	200	122	10	..	1	325	13	46	170	10	3
July .....	....	1341	53	90	89	16	..	1	956	38	57	183	10	3
August .....	....	1255	50	90	92	10	..	1	944	38	61	215	12	0
September .....	....	1181	47	200	144	18	..	1	929	37	39	148	17	0
October .....	....	.....	....	100	94	5	..	1	360	14	187	327	7	15
November .....	....	.....	....	95	93	6	..	1	378	....	277	193	8	20
December .....	....	.....	....	.....	....	..	..	1	370	....	128	223	2	0
Totals.....	1	13075	....	1691	1418	1	15	1	7599	....	1094	2305	12	13

MONTHLY STATEMENT FROM EACH GOLD DISTRICT.—(CONTINUED.)

MONTH.	LAKE CATCHA.							RAWDON.						
	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Grs.	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Grs.
January	2	741	30	49	355	14	..	2	3970	160	636	313	1	0
February	2	609	24	90	348	7	..	2	3569	142	130	276	3	5
March	1	786	31	101	368	10	..	2	4034	160	647	298	16	0
April	1	968	38	89	300	1	..	2	2773	111	375	289	3	15
May	2	1416	56	76	167	5	..	2	2780	111	387	313	2	0
June	1	1064	42	84	138	15	..	2	2836	113	450	390	9	6
July	1	1163	46	85	450	0	..	1	1403	56	383	314	3	15
August	1	1167	46	64	186	2	..	1	1410	56	350	346	19	0
September	1	1084	43	60	234	15	..	1	1400	55	417	234	18	0
October	2	1083	....	73	206	8	..	2	1765	71	475	272	4	0
November	2	996	....	61	191	5	..	2	2613	104	450	237	18	15
December	2	1039	....	69	112	2	..	2	3007	120	602	220	15	0
Totals	1	12116	....	601	2959	4	..	2	31560	....	5302	3507	13	8

MONTHLY STATEMENT FROM EACH GOLD DISTRICT.—(CONTINUED.)

MONTH.	FIFTEEN MILE STREAM.							UNPROCLAIMED, ETC.						
	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Grs.	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Oz.	Dwt.	Grs.
January.....	1	284	11	187	142	1	0
February	339	13	.....	....	..	..	2	748	30	445	179	11	8
March	707	28	.....	....	..	..	3	865	34	96	96	51	0
April	447	18	.....	....	..	..	3	310	12	176	134	17	2
May	349	14	80	42	10	0	3	422	16	204	204	17	0
June	343	14	80	31	0	0	....	1709	70	34	33	2	0
July	353	14	51	64	5	0	4	1607	64	58	14	14	18
August	357	14	78	34	0	0	3	1669	67	14	26	5	0
September.....	478	20	120	59	10	0	3	1837	73	242	63	15	19
October	534	21	160	68	10	0	6	1851	74	....	....	..	..
November	548	22	120	45	15	0	8	3125	125	26	6	2	17
December	465	18	140	52	15	0	8	2060	80	....	....	..	..
Totals.....	1	4920	.....	829	398	5	0	4	16487	....	1378	856	6	16

GOLD.

GENERAL ANNUAL SUMMARY.

YEAR.	Total ounces of Gold extracted.			Stuff Crushed.	Yield per ton of 2,000 lbs.			Total Days' Labor.	Average earnings per man per day and year, at 300 working days, \$18 per oz.	
	Oz.	Dwt.	Grs.	Tons.	Oz.	Dwt.	Gr.		A day.	A year.
1862	7275	0	0	6473	1	2	11	156000	\$ 83	\$249
1863	14001	14	17	17002		16	11	273264	92	276
1864	20022	18	13	21434		18	16	252720	1 42	426
1865	25454	4	8	24423	1	0	20	212966	2 15	645
1866	25204	13	2	32161		15	2	211796	2 14	642
1867	27314	11	11	31386		17	9	218894	2 24	672
1868	20541	6	10	32262		12	17	241462	1 53	459
1869	17868	0	19	35147		10	4	210938	1 52	456
1870	19866	5	5	30829		12	21	173680	2 05	615
1871	19227	7	4	30791		12	11	162992	2 12	636
1872	13094	17	6	17093		15	7	112476	2 09	627
1873	11852	7	19	17708		13	9	93570	2 28	684
1874	9140	13	9	13844		13	5	77246	2 12	636
1875	11208	14	19	14810		15	4	91698	2 20	660
1876	12038	13	18	15490		15	13	111304	1 94	582
1877	16882	6	1	17369		19	10	123565	2 46	738
1878	12577	1	22	17990		13	23	110422	2 05	615
1879	13801	8	10	15936		17	8	92002	2 34	702
1880	13234	0	4	14037		18	20	103826	2 18	654
1881	10756	13	2	15556		12	20	126308	1 52	456
1882	14107	3	20	22081		12	18	106884	2 37	711
1883	15446	9	23	25954		10	21	97733	2 84	862
1884	16059	18	17	25147		12	18	118087	2 40	720
1885	22203	12	20	28890		15	4	157421	2 53	759
1886	23362	5	13	29010		16	2	128880	3 25	975
1887	21211	17	18	22280		19	11	173448	2 20	660
Total	433754	6	22	576103	.....			3939942	.....	.....

MINERALS OTHER THAN THOSE LEASED FROM THE CROWN.

IRON ORE MINING.

Londonderry	Tons.	43,360
Springville		172
		43,532

AVERAGE FORCE EMPLOYED.

Skilled workmen :

	No. of Men.	Days' Labor.
Under ground.....	64	17,371
Above ground.....	13	4,041
Unskilled workmen :		
Above ground.....	30	7,662
Under ground.....	53	12,902
	160	41,976

LIMESTONE.

	Tons.	Value.
St. Peter's, C. B.....	5,681	\$4,000
Arichat, C. B.....	4,000	3,000
Brookfield	14,391	.....
Londonderry (ankerite)	80	.....
	24,152	

BARYTES.

Henderson & Potts, }	Tons.	400
Brookfield. }		
Average employed daily for four months.....		6

GRINDSTONES, ETC.

Lower Cove,	}	\$8387 00
Cumberland Co.,		
Messrs. A. Seaman & Co.,		

ANTIMONY ORE.

Rawdon Mine.....	Tons.	550
Average number of men employed above ground.....		20
" " " below "		22

MOULDING SAND.

	Tons.	Value.
Cheverie	160	\$800

MANGANESE.

	Tons.	Value.
Onslow Mine	40	\$ 2,800 (?)
Pembroke	25	1,750 (?)
Tenny Cape	235	16,450
Cornwallis	385	2,233
Cheverie	5	200
Maitland	1	60
	<hr/> 691	<hr/> \$23,493

GYPSUM.

	Tons.	Value.
*Windsor	87,175	\$86,595
*Cheverie	23,870	17,840
*Walton	545	382
*Halifax	316	1,543
Arichat, C B.	340	275
St. Ann's, C. B.	4,100	4,000
	<hr/> 116,346	<hr/> \$110,635

* BUILDING STONE.

	Tons.	Value.
Amherst	4,906	\$24,285
Antigonish	28	112

* Amount exported.

From the Annual Statistical Report of the Dominion of Canada issued by the Geological Survey, it appears that during the year 1887 there were 9,473 cubic yards of stone quarried in Nova Scotia, and valued at \$84,051.00. That 16,000 bushels of lime were burned, and that 7190 M. of brick were made at a valuation of \$50,630.00.

INTERCOLONIAL RAILWAY.

STATEMENT shewing number of tons of Coal received at the following Stations from Mines in Nova Scotia, for the Year ended 31st December, 1887.

Stations.	No. of Tons.	Stations.	No. of Tons.
Halifax	39509	Petitcodiac	135
Dartmouth	5889	Penobsquis	1862
Bedford	498	Sussex	340
Windsor Junction	4253	Apohaqui	6
Wellington	55	Norton	50
Enfield	396	Bloomfield	10
Elmsdale	206	Hampton	521
Milford	54	Rothsay	121
Shubenacadie	200	Cold Brook	6599
Stewiacke	449	Saint John	43052
Brookfield	68	Berry's Mill	24
Truro	6034	Weldford	20
Valley	30	Kent Junction	404
West River	24	Chatham Junction	2063
Glengarry	18	Derby Junction	67
Hopewell	801	Newcastle	67
Stellarton	105	Gloucester Junction ..	592
New Glasgow	18592	Bathurst	54
Pictou Landing	67479	Petite Roche	17
Pictou	663	Jacquet River	18
Belmont	38	New Mills	6
Debert	30	Charlo	12
East Mines	24	Dalhousie Junction	145
Londonderry	65922	Campbellton	90
Wentworth	18	Metapedia	118
Greenville	24	Little Metis	6
Thomson	18	St. Octave	12
Oxford	300	Ste. Flavie	18
River Philip	31	Rimouski	12
Athol	12	St. Fabien	59
Maccan	25	Trois Pistoles	56
Nappan	72	Riviere du Loup	930
Amherst	5189	St. Alexandre	6
Aulac	268	St. Henri	16991
Sackville	2278	Chaudiere, (Local)	79099
Dorchester	786	do (West of) ..	75449
Memramcook	277	Levis	52
Painsec Junction	17	Pointe Levis	20431
Shediac	302	East. Extension Points.	2691
Point du Chene	67		
Moncton	17061		
Salisbury	1134		
		Total....	491420

From the following Stations :

STATIONS.	No. of Tons.
Maccan	11217
Spring Hill	304273
Stellarton	126150
New Glasgow	18039
Drummond	20111
Westville	2630
Total.....	491420

MONCTON, N. B., Feb. 15th, 1888.

INTERCOLONIAL RAILWAY.

Statement shewing the Quantities in Tons of the different kinds of Coal received from the various Mines, for the use of the Intercolonial Railway during the Year 1887.

MONTH.	Spring Hill.			Acadia.				Drummond.			Chignecto.		Gowrie (round.)	
	Round.	Run of Mine.	Slack	Round.	Run of Mine.	Slack	Nut.	Coke.	Round.	Run of Mine.	Slack	Round.		Slack
January	24	8888	16	.....	2424	.....	.....	.....	.....	1805	.....	.....	.....	.....
February.....	1169	7772	48	.....	79	.....	.....	.....	216	1390	6	.....	15	.....
March	5118	7160	68	.....	.....	.....	.....	.....	417	2928	.....	20	.....	.....
April	5496	6647	104	17	.....	.....	.....	.....	256	3729	.....	35	.....	.....
May.....	3176	5726	12	.....	1035	.....	.....	.....	224	1877	.....	20	.....	.....
June	2139	6302	.....	.....	4582	25	.....	11	838	1021	.....	21	.....	.....
July.....	1073	7122	12	4734	278	127	.....	10	730	124	.....	.....	.....	.....
August	4811	5689	.....	4555	.....	.....	.....	9	1559	.....	.....	.....	.....	.....
September	2913	4765	48	4471	.....	88	.....	.....	872	.....	.....	.....	.....	309
October	2861	5680	.....	5161	.....	70	.....	12	789	.....	.....	.....	.....	1167
November	3539	4625	.....	7427	.....	60	.....	13	1400	3422	.....	.....	.....	.....
December	5233	6312	.....	5476	.....	28	11	.....	1522	3689	.....	.....	.....	.....
Totals.....	37552	76688	308	31841	8398	398	11	55	8823	19985	6	96	15	1476

MONCTON, N. B., February 17th, 1888.

THE following shows the increase in coal traffic from the mines in Nova Scotia to the Upper Provinces, for the year ended 31st December:—

	Tons.
1879.....	570
1880.....	10,246
1881.....	30,629
1882.....	35,089
1883.....	54,891
1884.....	112,898
1885.....	165,791

WINDSOR.

Product of the Mine exported from the Port of Windsor and its outports during the year ended the 31st December, 1887.

	Tons.	Value.
Gypsum, from Windsor	87,175	\$86,595
" " Cheverie	23,870	17,840
" " Walton	545	382
Total	111,590	\$104,817
Manganese, from Windsor	190	13,380
" " Cheverie	5	200
" " Maitland	1	60
Total	196	\$13,640
Moulding Sand, Cheverie	160	\$800
Total product of the Mine		<u>\$119,257</u>

HALIFAX.

Summary Statement of Articles, the Produce of the Mine, exported from the Port of Halifax, for the year ending 31st December, 1887.

ARTICLES.	The Produce of Canada.		Not the Produce of Canada.	
	Quantity.	Value.	Quantity.	Value.
Coal .....Tons.	15994	\$ 50997	3300	\$ 9072
Gold.....		321379	.....	.....
Ores, all kinds.....		6420	.....	.....
Gypsum, crude .....Tons.	316	1543	.....	.....
Salt .....Bushels.			87655	13152
Slate		880	.....	.....
Other Articles.....		79	.....	.....
Oils, Coal, &c.....	281	68	2203	151
Total.....		\$381366	.....	\$22375

The above oil does not include package value.

REPORT
OF THE
DEPARTMENT OF MINES,
NOVA SCOTIA,
FOR THE YEAR 1889.



HALIFAX, N. S.:
COMMISSIONER OF PUBLIC WORKS AND MINES, QUEEN'S PRINTER.
1890.

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DEPARTMENT OF MINES.

REPORT FOR THE YEAR 1889.

*To His Honor the Hon. A. W. McLelan, Lieutenant-Governor of
Nova Scotia, &c.; &c.*

MAY IT PLEASE YOUR HONOR,—

I respectfully present herewith to Your Honor the Annual Report of the Inspector of Mines, containing an account of the progress of mining operations, together with statistical information compiled by him from official and other returns.

I remain,

Your Honor's obedient servant,

CHARLES E. CHURCH,
Commissioner of Public Works and Mines.

HALIFAX, March 3rd, 1890.

REPORT

ON THE

MINES OF NOVA SCOTIA,

BY EDWIN GILPIN, Jr., A. M., F. G. S.,

Fellow of the Royal Society of Canada, Member of Council
of Canadian Society of Civil Engineers, etc.

OFFICE OF INSPECTOR OF MINES,
HALIFAX, March 1st, 1890.

TO THE HONORABLE

CHARLES E. CHURCH, M. P. P., M. E. C.,

Commissioner of Public Works and Mines.

SIR,—I beg leave to submit the following report on the Mines of
Nova Scotia, for the year ending December 31st, 1889.

The following summary shows, so far as I have been able to learn,
the mineral production of Nova Scotia during the year 1889, compared
with that of the previous year :

	1888.	1889.
Gold.....Ounces....	22,407	26,155
Iron Ore .....Tons.....	41,611	45,907
Manganese Ore "	88	67
*Coal raised "	1,776,128	1,756,279
*Coke made "	29,808	35,565
†Gypsum "	125,800	147,344
Barytes "	1,100	
†Grindstones, &c. "	17,225	18,000
†Moulding Sand..... "	169	170
†Antimony Ore "	308	55
Limestone "	15,448	19,000
Copper Ore..... "		500

Through the kindness of the Collectors of Customs at the various
ports of the Province, I am enabled to give further details under this
head at the end of the report.

* Ton of 2240 lbs.
† Amount exported.
‡ Value in dollars.

In addition to detailed notices of the operations of each mine, and the usual statistical tables, I submit a summary of the amounts and values of minerals produced not paying royalty to your Honorable Government.

I also beg to enclose the reports of Wm. Maddin, Jr., Esq., Deputy Inspector for the Counties of Cumberland, Pictou and Colchester, and of P. Neville, Esq., Deputy Inspector for Cape Breton.

COAL TRADE.

The total sales for the year 1889 amounted to 1,555,107 tons, against 1,576,692 tons in 1888.

As compared with the sales of the year 1888 the most noticeable points are :—

The home sales were 550,425 tons as compared with 509,425 tons in 1888.

The Province of Quebec took 631,796 tons against 678,321 tons in 1888, and 650,858 tons in 1887.

The sales to New Brunswick were 195,174 tons against 214,630 tons in 1888.

The sales to Newfoundland and Prince Edward Island show no change of importance.

The sales to the United States were 29,986 tons as compared with 30,198 tons during the year 1888. Of the amount sent to the United States last year 24,331 tons were slack, 190 tons were run of mine, and only 5,465 tons were round coal.

CUMBERLAND COUNTY.

The total sales of this County were 419,628 tons against 419,549 tons in 1888.

The production of the Springhill Mines was 425,149 tons. The fire in the Syndicate Slope was successfully extinguished by damming water up against it. It is proposed to utilise it for the present as an up-cast and travelling road. The New or No. 5 Slope shows the turn of the measures toward Amherst. It is now down about 1200 feet, and the levels going north show coal of good quality. It is reported that not far from the northwest corner of the old General

Mining Association's area, a coal outcrop has been found. If it dips toward Springhill it will complete the structure of a basin. If the dip should be northward the Springhill Basin is either complete or the northwardly dip of the crop would show that there is in Springhill a basin subsidiary to the great basin of the coal-field. As these mines give off more gas than in former years, the management are introducing safety-lamps at several points.

The Chignecto Colliery worked steadily during the year, the output being 18,572 tons.

At the Joggins Mines the output was 45,411 tons, and it is expected that this amount will be exceeded this year.

The Minudie Mine worked a little during the first of the year, and was re-opened towards its close.

Mr. Sharp and others prospected on several seams of coal lying east of the Styles Mines, which were named the North, Bottle Glass, South, New, and Nine feet. The quality of the coal exposed appears to be good—and the tracing of coal seams in this direction adds materially to the known extent of the coal field.

The sales to the Province of Quebec from this county were 177,461 tons, compared with 182,927 tons during the year 1888.

PICTOU COUNTY.

The total sales were 383,482 tons against 418,893 tons in 1888, and 339,034 tons in 1887.

The home sales were 247,708, against 228,805 tons during the preceding year.

The Province of Quebec took 73,261 tons, compared with 114,382 tons in 1888.

The Acadia Company raised 269,607 tons, and the Intercolonial Company raised 125,957 tons. The output of the Black Diamond Colliery was 34,015 tons.

At the Intercolonial Colliery arrangements were made for working the coal in an adjoining area belonging to Mr. S. H. Holmes, included between the line of the Intercolonial Company and the supposed southerly extension of the McCulloch Brook fault.

The drift referred to in my last, as started in the Black Diamond Company's mine, to test the underlying measures, met heavy feeders of water, and was abandoned. A dam was put in to keep the water from finding its way into the Acadia Co.'s workings.

Mr. Maddin, in his report, refers to the fire in the Vale Colliery at the close of the year. There is no direct evidence as to the cause of the fire, and apparently it must have been due to the heat caused by the steam pipes. Some months ago, in the Maurice Wood Colliery (England), under circumstances apparently the same, a similar fire took place—unfortunately involving the loss of 64 lives. A lengthy enquiry was held, but no satisfactory results were reached as to the cause of the fire.

The injury inflicted on the Vale Colliery by this fire brings up again the question of the adaptability of the Mines Regulation Act to all the problems arising in the course of working our coal mines. The law provides certain regulations of an excellent character, general in their provisions and adapted to all mines, more particularly in respect to examination, use of explosives, etc. In regard to other matters not specially provided for the Inspector may require that changes be made. If his opinion be objected to recourse may be had to arbitration. Our Act containing this provision is copied from the English Act.

This provision in the English Act is presumably intended to meet the wide divergence which exists as to what is good and what is bad mining practice in any particular matter. In the case of the English coal mine lands it must in this connection be remembered that they are owned by individuals, and are transferred and leased free from any government control. It is, therefore, easily seen that the government, admitting to the fullest extent the right of an individual to work his mine as he thought proper, confined itself to enactments more directly affecting the personal safety of the miner, and left the questions of modes of working to the self-interest of the owner.

The position of matters in this Province, however, is somewhat different. Here the Government is the direct owner of the coal, and as such it is a question if the interference in the conduct of the mines could not be advantageously carried a step further. There are many points which are matters of disputed practice, there are certain safe general principles, and there are mining operations in accordance with good mining practice, which are with reason open to serious objections. I may mention here the time when open lights should be superseded by safety lamps, the moment when the use of gunpowder should be abandoned, the use of furnaces underground, the connection of one or more seams by the same shafts, the retention of reserve blocks of coal for future sinkings to deeper seams, etc.

Should the duty of drawing the line of safety in these and similar questions be left to impartial hands, there is no doubt that in some mines rules could be laid down which would increase the safety of working, and assist in preserving the store of coal. The enforcement however of these rules would be met by the statement, which has good ground in fact, that the increased cost in mining would destroy any profits or lose a market. This brings the subject to a crucial point: Is public opinion willing that a mine should be closed? That

for a term of years no royalty should accrue? And that some scores of men should not find work in it, and in so doing be satisfied that it is not too dear a price to pay for the assurance that an effort is being made to preserve so important a resource? It is a question if, broadly speaking, the general interests of the Province would not be benefited by stricter enactments, even if they led to greater costs of mining and their consequences. Or must the present state of affairs continue where we see gaseous, or heavily watered, or pitching seams, with their necessarily heavy cost sheets, competing in market with coals mined under every natural advantage? There is not only a temptation in the case of the former class of mines, but almost necessarily a time comes when renewed expenditure for equipment becomes impossible, and a mine goes staggering like a disabled ship because the price got for its coal is not in proportion to the cost of getting it. When this stage in the history of a mine is reached, it is exposed to attacks from natural causes as well as to those due to the imperfection of the ordinary man. This unequal contest between mines is not confined to this Province; it is seen everywhere, and while the philosopher may complacently regard it as a good example of the law of the survival of the fittest, the economist regrets that the contest is too often marked by the wrecks of mines that should not have been wrecked, or whose workings should have been suspended until conditions of trade allowed fair returns.

I am informed that in Germany this question has received some attention, and that regulations are made applying to districts, groups of mines, or even to individual mines, so that there is always present a factor in favor of safety against cost, and a retention of the coal against its present and often profitless extraction. I may add that this view of the matter was brought before the special committee appointed by your Honorable House of Assembly session before last.

I append Mr. Maddin's report on visits to the collieries of Pictou and Cumberland during the year last past:

WESTVILLE, N. S.,

Dec. 31st, 1889.

E. GILPIN, ESQ.,

Inspector of Mines, &c.

DEAR SIR,—I have the honor to respectfully submit herewith a summarized and condensed statement of my official work as Deputy Inspector of Mines for the District of Pictou, Colchester and Cumberland for the year ending the 31st day of December, A. D., 1889.

INTERCOLONIAL COAL MINING COMPANY, WESTVILLE, SLOPES.

Nos. 1 and 2.—Work in this mine has been for some time attended with some degree of danger, owing to a "creep" which seemed to imperil the safety of some portions of the mine. I am of

opinion that the danger of that is past, as no indication of any serious nature has been seen for the past few months in the year, and a large percentage of coal is now being successfully won. The air is kept well up to the workmen, of which, as see per return, a very large volume circulates in this mine.

SCOTT PIT.

Work has not been carried on to any large extent in this mine. During the latter portion of the year (12) twelve men were started to work with a view to pierce through a fault in the east side, and there test the quality of the coal. This was done, and the coal proved satisfactory, the fault being an upthrow of some 16 or 18 feet. Since that time no work has been done.

ACADIA COAL COMPANY, LIMITED.

Acadia Slope, Westville.—This slope is now down a distance of 3560 feet, a new lift having been sunk this summer of 440 feet. A considerable quantity of gas is met with in this lift, but every precaution as hitherto is taken to guard against every possible accident. No powder is used in the new lift or in any portion of the mine. A new overcast airway, as well as air returns, are completed, and a steady flow of air circulates freely round the different portions of the mine. The air and regulations were all that could be desired.

McGregor Pit, Stellarton.—This pit has been kept steadily to work all the year, and the workings extended to the deep. The North Slant, which is down now a distance of 2,760 feet at the top dip at an angle of 16° , and at the bottom 25° . I made several tests during the year in the air returns as to the percentage of gas contained. Considerable precaution has to be exercised in this mine, the coal being inclined to evolve gas. I have much pleasure in saying that the air was kept well up to working faces, and at no time in such places was there any indications of gas; however, in the returns I found percentages of $1\frac{1}{3}$, $1\frac{1}{2}$ and $\frac{4}{5}$. Pillar working, which in all mines is attended with danger to the immediate workmen, has been prosecuted successfully, and a very satisfactory percentage of coal is being had.

No. 1 Slope (Stellarton)—Has been for a considerable portion of the year under repairs and pumping the water out. A new pump and boiler have been placed in position and set to work.

English Slope (Cape Pit Seam, Stellarton)—At my last report was down 700 feet, and at date is down about 1700 feet. During the latter part of year some gas has been met, and, in consequence, safety lamps are used. In the distance gone down two-fourths have been encountered in the coal measures.

Foord Pit, Stellarton.—After much perseverance and difficulty they have succeeded in clearing the bottom of the Square Pit, and getting their large pump in effective condition. Very serious obstacles

have been met and overcome in doing this much, and we trust that ere long this fine mine will again be in working order.

I might say here that no serious accidents have occurred during the progress of this undertaking, with the exception of one or two slight casualties ; nothing to injure either life or limbs.

Vale Colliery (Thorburn).—The McBean improvements have been made during the year in the air-passages, by making connections between 2600 feet level and 1800 feet level, thus decreasing the distance air had to travel, and consequently increasing the air current around working faces. I regret to say that an accident, fortunately attended without loss of life, but involving a serious loss to employers and employes, occurred on December 23rd. At that date symptoms of fire were discovered in the pipe head, 800 or 900 feet from surface; immediate exertions were made to extinguish the fire, but unfortunately although every effort was made they were unsuccessful, and were compelled eventually to close up all openings into or from the mine. A matter worthy of notice here is that in closing up the mine no explosion followed; in all or nearly all former cases of this kind the closing up of a mine on fire has caused or been attended with an explosion subsequent to such closing. The method adopted, was first to partially close the outlets, next one in-take, of which there are two, then slow the face to half speed, next to partially close the remaining in-take, next close the outlet completely, remain 20 minutes, then completely close the in-take. Every praise is due to the employes for the heroic and untiring efforts they made in the attempt to save the mine.

EAST RIVER AREA.

John Muir & Sons.—A few men have been kept at work on this area for the most part of the year. As only a small business is done no extensive work of any kind is carried on. One balance has been worked out, and a new one started some 300 feet inside of the old one.

SPRING HILL MINES, CUMBERLAND CO.

The New Slope, No. 5, at (600) six hundred feet, pierced the West Slope seam. They continued sinking to about 1300 feet, and are now driving levels to connect with 1900 feet levels in East Slope. A considerable quantity of gas is given off in the working, and in consequence the management are using the safety lamp in the work.

East Slope.—Levels have been extended during the year, and evolve considerable quantity of gas. They began to extract the pillars in the 1900 feet level in August. In the return airway I have found gas in Indicator to read 1 and 1-10 per cent., and at other other times 6-10. A tunnel has been driven from the level on this lift to North Seam, and some gas has been met with in this part of the mine. During the summer the airways were enlarged and the volume of air increased.

West Slope.—Principally pillar work done here during the year. On the West side some gas is met with, which appears to exude from a small overlying seam, and in taking the pillars away small fissures or openings are caused in the roof, and permits the gas from said small seam to escape into the workings. A very large per centage of the coal is won.

North Slope.—The North Slope has been sunk 600 feet from bottom of Bore-Hole, previously reported and levels turned away, and the coal lifted up to the 1300 feet level. The levels have been extended 600 or 700 feet east and west. Gas has been met with in this new lift. During the year it was decided to put in 3 dams, viz., in Travelling Slope, Main and Pipe Slopes, and to flood to extinguish the fire in South Slope. At my visit in December, the slope was opened, and the fire appears to be extinguished.

OXFORD.

I ascertained in April that a mine had been started some short time previously near Oxford Station. I visited there on the 24th of the month, and found a slope down about one hundred feet, and the owners then purposed boring, but as yet have not done so.

At Londonderry on October 4th, a man named Scott Hillen was killed in the shaft by being caught with the cage.

JOGGINS.

In April they began sinking a new lift in the slope, and also drove a place to surface from the top-lift for an airway. They are now down a distance of 600 feet, and have levels driven in some distance, and a back balance completed. In extending levels on 1500 feet lift they crossed (3) three dikes or troubles in the coal measures, two down throws and one up throw. The coal is now pretty well extracted from old lift, and owing to so many faults on 1500 feet lift the output of coal has been retarded. The work is now in fair order, and we may reasonably anticipate the output to be materially increased next season.

CHIGNECTO.

The management have driven a plan from the present lower lift out to the surface on east side of mine, inside the old original fire, and are using it as a return airway and travelling slope, and during the latter portion of year have begun operating on the east side of mine. Some small fires during the year have originated from spontaneous combustion, but have been all built off and appear to have died out. They have been extracting pillars, but the angle or dip of the coal being so steep makes it a rather difficult job in this mine.

Ventilation has been always satisfactory.

S. E. FREEMAN.

The water is completely extracted now from this mine, and 9 or 10 men started to work. The ventilation, although only natural, has been always satisfactory. A new engine has been put up and several new buildings erected.

MINUDIE

Done some work in the beginning of the year, but were idle for a part of summer. They began work on November 12th, and at this time have 10 men at work underground, and attain an output of 20 tons per day.

BLACK DIAMOND MINE, WESTVILLE.

In January they began drawing the pillars to the rise, and extending the bords westerly to the dip, and subsequently began drawing the pillars in the lower lift. At present it is all pillar work which is being done very well. The tunnel mentioned in last report driven to test underlying seam was driven about 120 feet, when they struck some heavy feeders of water, they then stopped driving and put up a wooden dam (3) three feet thick to prevent the water escaping into the workings, as they connect with the Acadia Mine and were causing them trouble and expense to keep the water out. The wooden dam proved too weak to sustain the pressure, which is calculated to be about 300 lbs. to sq. in. A brick dam 2 ft. thick with 16 inch of a curve was subsequently built and likewise proved too weak. A third dam is now under course of construction; it is built in two sections. The inside section is 16 inches thick from pavement to 3 feet high, thence 12 inches thick to roof 5 feet; a space of (3) three feet is left when the outside section is built (3) three feet thick. Clay is rammed in the space between the sections. At my last visit the work was not completed.

Some small prospecting was done by Wm. P. McNeil, on the area lying immediately north of the East River area.

I herewith append the usual statements in tabulated form.

I remain, your most obedient servant,

WM. MADDIN, JR.,

Deputy Inspector of Mines.

OFFICIAL VISITS, YEAR 1889.

MINE.	Jan.	Feb.	March.	April.	May.	June.	July.	August.	Sept.	Oct.	Nov.	Dec.
Intercolonial } Slopes 1 and 2	16	11	5	11	6	8	5	17	13	17	8	4
Coal Co. } Scott Pit.....	Idle	.....	.....	.....	.....	.....	.....	.....	.....	.....	8	4
Acadia Coal } Acadia Slope, Westville. .	9	8	25	8	6	7	2	16	10	18	8	4
Company, } McGregor Pit	10	6	9	5	4	4	8	8	11	5	5	2
Lt'd. } No. 1 Slope	11	6	8	5	4	4	2	6	9	.....	6	3
English Slope.	11	5	6	4	3	3	2	6	9	.....	.....	.....
Vale.....	15	12	13	13	7	15	9	2	14	21	Idle.	.....
Spring Hill	{ 22	21	19	18	{ 16	19	17	21	{ 16	9	{ 13	12
Chignecto.....	{ 23	23	20	20	{ 17	20	19	22	{ 17	11	{ 14	13
Joggins ..	21	26	22	23	{ 18	21	30	22	{ 21	8	{ 25	11
Londonderry ..	22	25	21	22	22	22	29	23	21	8	12	10
Oxford Station ..	.....	.....	.....	.....	.....	.....	.....	.....	.....	7	.....	.....
East River Area—John Muir & Sons ..	15	12	13	13	7	15	9	12	14	21	21	19
Black Diamond	30	.....	{ 4	6	9	6	6	7	12	1	4	3
Minudie Slope.....	.....	.....	{ 25	21	Idle	until	.....	.....	.....	.....	12	9
Lawson Mine—S. E. Freeman	22	25	20	25	21	24	30	22	24	8	11	11

ACCIDENTS, YEAR 1889.

No.	Date.	Mine.	Name.	Occupation.	Remarks.
1	January 26....	McGregor Pit..	John Baker	Loader.....	Leg broken, jammed between box and prop.
2	March 2 ...	East River Area	Wm. Wylie	Miner	Collar bone broken, falling coal from face.
3	" 5....	Spring Hill....	James McCarthy ..	"	Leg broken, fall of coal north slope.
4	" 29....	"	Dan. Bigny	"	Head injured, fall of coal.
5	June 1....	"	Mat. McLeod	"	Foot badly injured
6	July 19....	"	Alex. Wilson.....	"	Burned by gas, slightly.
7	"	"	Daniel McSaveny..	"	" " "
8	" 26....	Vale.....	Fred Dougherty ..	Driver	Leg broken between two boxes.
9	September 3....	Spring Hill....	Michael Dunn	Miner	Foot injured, fall of top coal.
10	" 4....	Londonderry ..	Scott Killim	"	Killed, caught in shaft by cage.
11	" 16....	Spring Hill....	Duncan Cameron..	"	Burned with gas, slightly.
12	November 4....	Joggins	Amos White.....	Driver.....	Killed, struck by rake in slope.
13	" 17....	Spring Hill....	William Yarson ..	Miner	Leg broken by fall of top coal.
14	December 19....	"	George Yarson....	Overman....	Burned with gas, east slope.
15	"	"	John McLeod	Miner	" " "
16	"	"	Sam. McLeod	Loader.....	" " "

Volume of air in cubic feet per minute circulating in the Pictou and Cumberland Coal Mines, 1889.

	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	
Spring Hill.....	North Slope.	41,700	45,000	40,800	43,400	41,500	39,700	44,275	43,700	45,500	39,500	38,700	Blow-down fan.
	West "	52,400	42,400	51,500	52,100	51,700	50,800	50,500	49,600	48,700	42,000	40,100	" "
	East "	52,300	30,200	50,700	49,700	49,750	30,000	37,120	39,200	42,300	44,000	41,750	" "
	No. 5 "	14,000	12,000	12,000	13,000	20,000	4,000	1,775	6,500	7,800	22,300	21,500	Nat. Ventilation.
Chignecto Slope.....		31,200	32,350	31,700	28,100	30,250	29,600	28,400	26,250	27,800	26,800	26,100	Blow-down fan.
Joggins	Slope	22,750	21,600	Idle	37,600	33,950	31,800	28,500	23,300	29,700	24,000	26,600	Furnace.
S. E. Freeman.	Lawson Slope.....	Idle	princi-	pally	haul-	ing	water	.....	.....	.....	1,500	1,750	Nat. Ventilation.
Intercolonial Coal Co. }	Slopes 1 and 2.....	83,700	81,900	92,250	84,000	81,500	82,120	90,000	81,700	87,300	86,900	87,300	Exhaust fan.
	Scott Pit.....	Idle	until	.....	.....	.....	.....	.....	.....	.....	20,000	21,000	Furnace.
Acadia Coal Comp'y, Limited.	Acadia Slope.	66,000	59,000	62,700	52,000	50,000	56,000	52,900	54,400	56,000	50,000	53,000	Exhaust fan.
	McGregor Pit.	83,000	88,444	99,000	88,440	94,072	87,000	82,000	81,850	80,200	86,950	97,800	" "
	English Slope.	7,000	6,500	6,220	8,000	7,300	8,050	14,580	13,300	11,880	Idle	Idle	Furnace.
	Vale.	56,700	60,100	61,000	38,000	47,000	46,500	49,800	48,900	42,000	45,800	49,000	Exhaust fan.
East River Area.....	J. Muir & Son.	1,925	1,870	1,800	1,700	1,650	1,600	1,550	1,500	1,400	1,700	1,800	Nat. Ventilation.
Black Diamond	Slope.	14,200	.....	13,700	15,000	13,700	13,200	14,150	14,600	12,900	13,400	14,000	Blow-down fan.

 CAPE BRETON CO.

The total sales for this County were 751,997 tons against 738,250 tons in 1888, and 715,442 tons in 1887.

The home sales were 200,182 tons, compared with 190,508 tons in the year 1888.

The sales to Quebec were 381,074 tons, against 381,012 tons during the former year.

The United States took 5,333 tons of round coal, and 13,733 tons of slack coal against 2,685 tons of round and 21,098 tons of slack coal sent there the year before.

The manufacture of coke at the Gowrie has been continued, and I understand that the quality of the article is satisfactory. In connection with the fact that coke can probably be made as cheap, if not cheaper, in Cape Breton than in any other part of the world, the following remarks by Mr. G. G. Andre, published in the *Colliery Guardian* (English), are of interest :—

“It sounds more like fable than fact to talk of importing coke from America ; but there is, nevertheless, a prospect of seeing a good deal of United States coke shipped for the European markets in the course of the next six months. The project is under serious consideration, and a little reflection is sufficient to show the scheme to be feasible. The price of blast furnace coke in Germany is from 20s. to 21s. a ton at the ovens. In Belgium the same price has to be paid, and in France the rates are moving up to the same level. At the present time coke in the United States is exceptionally cheap, so that there is a sufficiently wide margin for freight and profit. The price of blast furnace coke in Pittsburg is from 5s. 6d. to 7s. a ton. On a margin of 14s. something might be done in the way of profitable trade. I learn from a trustworthy source that the attempt will certainly be made. Already the arrangements are in an advanced stage of preparation.”

The production and sales of the various Cape Breton collieries during the past year was as follows :—

	Production.	Sales.
Bridgeport	21,496 Tons.	24,222 Tons.
Caledonia.....	114,299 “	102,980 “
Franklyn.....	4,046 “	4,404 “
Glace Bay	80,920 “	73,919 “
Gowrie.....	111,700 “	100,445 “
International	123,915 “	118,086 “
Ontario	2,866 “	2,604 “
Reserve.....	121,649 “	110,225 “
Sydney	144,966 “	123,902 “
Victoria.....	108,601 “	91,120 “

I beg to submit Mr. P. Neville's report on his work as Deputy Inspector for the Island of Cape Breton :—

BRIDGEPORT, *Jan. 9th, 1890.*

E. GILPIN, JR., ESQ.,

Deputy Commissioner and Inspector of Mines.

DEAR SIR,—I beg leave to forward a report to you of my inspection through the different mines in the Island of Cape Breton during the year 1889. I also enclose tables of Number of Visits, Air Measurements, and Accidents.

SYDNEY MINES.

I made several visits during the year. The new deep, mentioned in last report south of pit bottom, has been driven 26 chains across the old workings into solid coal, the work is expected to be extensive in that section next season. The coal on the north side in what is called Skinner's, is getting very thin in many places, not over two feet eight inches thick. Also, it is getting thin in No. 2 Section, below that. The condenser, which condenses the steam of the two winding engines, is getting out of order, and a new trotting condenser from England is to be put in place of it.

Also they are fitting up a new underground, forcing pump of 36 in. cylinder and 5 feet stroke to force the water from pit bottom, in one lift of about 700 feet, to the surface, and thus take the place of the large Cornish set of pumps. A stone engine house with arched brick roof is being built at the pit bottom for this pump. Our surface tressel work is built to the outer side of the coal yard, and an apparatus put up by which the tubs of coal for banking are drawn out to the bank by an engine. A screen is erected for screening the coal on the outer side of the heap, and a branch rail road to this screen from the main line.

VICTORIA MINES.

Work has been brisk for the season. West levels are extended five hundred and fifty yards, and the east levels, four hundred and fifty yards. East slope has been straightened and graded. The length of the slopes at present from the surface to the low levels are about twelve hundred feet. About the first of September at the east side of No. 1 Balance East Slope, two rooms broke in from the roof, letting in a feeder of water which runs about 6000 gallons in twenty-four hours. On the 20th of November, six more fell in. The cause of these rooms falling is, that the roof was not good. As the rooms came in proximity with the fault approaching that point, it would be well to have the pillars larger or the rooms narrower.

A new Blake pump has been placed at the bottom of the lower lift, which discharges to the upper pump and lodgement. Its dimensions are as follows, cylinder 15 inch, 12 inch stroke, six inch plunger, calculated to throw 130 gallons per minute. A new trolly has been made and placed on the slopes for the men to ride in, ten at a time. The management says they intend to put another on, so there will be one for each slope.

The screens and bank have been roofed and covered in.

OLD BRIDGEPORT.

This mine has worked pretty steadily during the season; the coal mined and shipped from there has been chiefly taken from the south side of the headway and workings.

As the rooms extend to the south the band of shale between the two seams gets thin, and consequently the roof gets bad; but I must say great care is taken to have the place well timbered. I understand it is the intention of Mr. Mitchell to have it after this taken down wherever it is thin. The coal seems to improve as the works extend to the south.

Tressel work has been erected over the banking ground, in order to prevent breakage of coal, which I believe is a decided improvement.

INTERNATIONAL.

This mine worked pretty steadily during the shipping season. The water coming through the fallen room in No. 7 Section, mentioned in my last report, has decreased from 52 gallons per minute to about 15. A new lift of 600 feet has been gained to the dip; levels turned off right and left at that point.

The coal seems much improved, being more free from impurities and the seam thicker. In order to test the Ross Seam under this area, a slope has been driven into the crop of it about one hundred feet. The coal is five feet seven inches thick, and appears to be a good quality.

RESERVE MINES.

I visited regularly every month. The east slope has been driven three hundred and ninety-six feet down; and levels turned off. North level driven six hundred feet; south level driven five hundred feet. In the main or west slope fifteen rooms were worked, some of them driven to the barrier. Six pairs of men to the rise of this were kept splitting and drawing pillars. The old furnace has been pulled down and a new one built in place of it, which is about six inches wider and higher than the old one. The management say that it is their intention this winter to drive the east slope down six hundred feet further in order to gain another lift.

LITTLE GLACE BAY.

There has not been much change in the workings here, except, that the levels on the north side have been driven about five hundred feet into the Campbell area, which I am informed that they now control. Also, the level on the south side of the pit has been driven five hundred feet.

On surface, a new locomotive shed has been built, and the railroad wide gauged from pit to wharf. New four and a half ton cars built and put on the track instead of the pit tubs. The bank and screens have been roofed and covered in. A new shed for a saw-mill built, and a steam saw-mill placed therein.

CALEDONIA.

I cannot note any new feature in this mine; work has gone on as usual both to the dip and rise; dip levels have been extended on the east and south side, and rooms worked off; a few pillars have been split and drawn from the south side of the rise workings. On surface, a new No. 3 Manville Windmill and Starr pump has been placed over a well twenty chains north from pit, which supplies the reservoir with water and gives good satisfaction.

ONTARIO MINES.

Work has been very slack here this season. In the early part of the season a new level was started at the seashore to gain a better hold on the coal at the inner part of the workings; but this did not prove satisfactory, and it was discontinued.

I understand that Mr. Thomas Routledge has it bonded or leased for a term of years; and that it is his intention to have the lift pumped out and ready for work in the spring.

GOWRIE MINES.

The main dips have been driven down seven hundred and fifty feet, which now makes them eighteen hundred feet from shaft level; from that point levels are turned off east and driven nine hundred feet. Also the west levels from the upper dip have been driven three hundred feet, which makes it about eighteen hundred feet from the landing.

A pair of slants is being driven from the level to come out on the west level near the pit bottom. The coal from the west side is to be drawn up this slant next season; a new pump has been placed at the bottom of the low lift, which delivers water from there to the lodgement and pumps of No. 1 deep.

In conclusion, I regret to have to report so many fatal accidents; you will observe that the most fatal class is caused from fall of loose

coal while working under it. The control of this is chiefly in the hands of the miners, if they would only attend to it; this danger would be avoided by putting wooden sprags under or against the coal where and when required. I am of the opinion that until an Act is passed by the Government compelling by fines or otherwise the use of wooden sprags that this class of accidents will go on in all the mines in Cape Breton. The general rule is that two men work together in each room or board; it seldom or never happens that both are caught at the same time by falling coal. If an Act was passed compelling the use of sprags, and if a fatal accident of that kind happened, then the uninjured one could be held responsible for a breach of the law.

I remain, your most obedient servant,

P. NEVILLE,
Deputy Inspector of Mines.

ACCIDENTS.

DATE.	NAME OF MINES.	NAME OF INJURED.	Occupation.	Age.	REMARKS.
Jan. 12....	Victoria Mines..	Alex. Nickelson.	Driver	14	Fell in front of full boxes; while getting off at landing, one passed over him. He died next day.
March 12	" ..	Edward Hall	Road Maker..	68	While walking up balance, was struck and killed by full coal box going down.
May 24, ..	International...	Antony McNeil..	Driver	16	Head bruised and cut by fall of loose coal from face of hanging junk.
June 8....	Sydney Mines ..	Charles Tutty....	Miner.....	21	Leg broke by fall of loose coal from face of room. Leg amputated twelve days after.
" 17....	" ..	James Jones	Driver	14	Killed by explosion of fire-damp while hauling timber in rooms.
" "	" ..	George Jones....	Driver	16	Burned by do. do. do.
July 9	Reserve Mines..	Hugh McDonald..	Miner	38	Killed by fall of loose coal from face of junk while at work in his room.
Sept. 23 ..	Sydney Mines ..	John Vicars	Miner	28	Injured by fall of loose coal from face of room. Died twelve days after from injuries.
October 8..	Victoria Mines..	Ambrose Laffin ..	Miner	20	Killed by fall of loose coal from face of junk in room while hauling.
" 18..	Gowrie Mines ..	Neil Johnstone ..	Miner	29	Back and shoulder bruised by fall of stone from roof.

COAL—MISCELLANEOUS.

Cumberland Co.—During the past year explorations were carried on to the East of the Styles mine by Messrs. Sharp, Hickman, *et al.*, and several seams said to vary in thickness up to eight feet were discovered. The coal is of good quality, and the results of the explorations, it is claimed, prove the extension of the Cumberland coal field for a considerable distance east of the limits hitherto generally assigned to it. Discoveries made to the Northwest of the old General Mining Association area appear to show an anticlinal, having the Springhill Basin to the South, and the Maccan and Styles Basin to the North. If these results are confirmed a much greater portion of the Cumberland coal field will be accessible to the miner than has hitherto appeared possible. Some little work was also done in tracing the Oxford seams, which appear to form a basin, having a general East and West course.

Colchester Co.—At Coal Brook, about 12 miles from Truro, Mr. George Ross, of Truro, secured a lease, and has opened a seam of coal of good quality, said to be 3 feet 9 inches thick. Some prospecting was also done at Middle Stewiacke.

Pictou Co.—I am not aware of any discoveries of coal during the past season. Mr. H. R. Fletcher, of the Canadian Geological Survey, well known for his report on the Sydney coal field, devoted much of his time last year to the Pictou coal field, and as he has had access to all sources of information it is expected that his work will throw light on some of the disputed questions about its structure.

Cape Breton Co.—Mr. Greener has continued his explorations in the vicinity of North Sydney, in the measures lying on the prolongation of the Low Point coal strata. From analyses made of two of the seams by Mr. Maynard Bowman, Dominion Analyst, they are of excellent quality, when it is considered that the samples were taken from the outcrop, the per centage of ash running as low as 2.06, and of sulphur less than one per cent. Toward the close of the year I understand that Mr. Greener drove in some distance on one of the seams and found that it was thickening, and was then 5 feet 3 inches thick. The importance of the discovery of a workable seam of good quality at this point is apparent, for a large tract of coal-bearing measures becomes proved, and encouragement is given to others to search outside the hitherto recognized limits of the Sydney coal field. Explorations were also carried on in the district west of the Gardiner Mine and a license to work selected.

The total receipts from licenses to search, licenses to work, and leases was \$8135.00.

The rental law went into operation June 17, 1889, and since that date thirty-six leases have been applied for, and six applications have been made by lessees to bring their leases under its application. The

total number of square miles thus placed under the rental law is forty-five, which may be counted upon as yielding an annual addition to the Mines Revenue of \$1350.00. The number would have been larger if a number of holders of licenses to search, applied for before June 17th, had not exercised their privilege of selecting rights to work instead of leases.

Wire Ropes.—In my last report reference was made to the Elliott Improved Combination Locked Rope. One system of making these ropes comprises a central strand of seven round wires, around this eleven other round wires are spun, and then follows two coverings of wedge shaped wires, the first having twenty, and the second twenty-seven wires. Outside of all comes a locking coil of thirty-four sectional wires. This rope has the appearance of a rigid bar, but it possesses abundant flexibility. Some of the advantages claimed for this rope are that the whole surface of the rope comes in for wear and the effects of friction are much less than in the common form of rope.

One of these ropes, $\frac{3}{4}$ of an inch, replacing a $1\frac{1}{4}$ steel rope, was in use at the Vale Colliery for a year and a half without showing signs of wear, and was reported as not being half as hard in pulleys and rollers as those of the ordinary make. I am informed that, at the Acadia Colliery, $\frac{1}{2}$ inch ropes of the Elliott pattern have been purchased for use on back balances, to replace $\frac{3}{4}$ inch ropes. The Deputy Inspector considers them an improvement in the ropes at present used in his district in every respect.

Mr. T. H. Deakin's remarks on the treatment of ropes:—

“Under this head I would call attention to the fact that rope manufacturers pay a high rate of railway carriage, to ensure the rope being kept dry and conveyed with care to its destination. It is equally necessary that in arriving at the colliery it should be stored in a house where it will be kept perfectly free from wet, steam and noxious fumes. I have heard of a rope suddenly breaking after being in work but a short time, and when there appeared to be no apparent reason for the failure, unless it be that it was kept at the colliery stores for a long time prior to its being put to work. If ropes are kept in stock any length of time, they should be in the dry and turned over and oiled from time to time with a good and pure oil, to insure them against rust. When wanted for work, the rope should be placed on a turn-table or reel so that it may be uncoiled. If treated in any other way the strands are certain to be more or less opened, and there is great risk of damage to the rope by kinking; and if a slight kink is once made, that portion of it is irretrievably damaged. The rope having been kept free from rust while in the stores, it is important to keep it so as far as possible whilst in use. This can best be done by making up a thick oil, and as the rope is being wound slowly on to the drum, and before it becomes wetted, this mixture should be applied and care taken to work it well into the crevices of the rope, so that it has the appearance of a solid bar.

Ordinary rope oil should then be applied for a few days consecutively, and afterwards, under ordinary conditions, an oiling once a week will keep it in good order. If this course is adopted it will be found to add immensely to the life of the rope. Some people object to having the ropes greased, because they say broken wires cannot be detected; but I, for one, do not subscribe to this doctrine. Ropes will, of course, stretch considerably on being first put to work, and for a time the engineman should be careful to start gently, so as to feel the load before putting on much strain."

Mr. W. Fairley, President of the South Staffordshire National Organization of Colliery Managers, thus sums up the reports of the English Mines Inspectors with relation to explosions:—

(1.) The non-occurrence of explosions in the Durham district was probably due to the good discipline enforced there, for certainly there was no lack of firedamp in the collieries in the district. (2.) That there was much danger in shot firing was proved by fires in South Wales and Cumberland, by which thirty-five lives were lost; and Mr. Wynne said that to do away with blasting in fiery mines would be to abolish explosions altogether. (3.) That it was dangerous to drive winning-places, especially in places in advance of the air, was proved again by the explosion which occurred at Deckham Hall Colliery. (4.) That there was a danger in men leaving their own places of work and rambling to other parts of the pit was proved by Mr. Wynne's and Mr. Wardell's reports. (5.) "Waffing" gas out of a pit was again proved to be dangerous by Mr. Ronaldson's report. (6.) The placing of scaffolds in shafts, and leaving the part below unventilated caused much danger, as had again been demonstrated by the explosions at Shaw Cross and Essington Farm Collieries. (7.) It was dangerous to make the sinking shaft a return, was proved in the accident which occurred at Newmarket Colliery, and which was reported upon fully by Mr. Wardell. (8.) The Clanny lamp was not safe under all conditions, the explosion at Newmarket having occurred through it. (9.) Gas was liberated when a heavy weight of the roof caused a fall, as was seen by the case which occurred at Lea Green Colliery in the Liverpool district. (10.) In no case of explosion had there been shown to be any connection between the weather and the occurrence. (11.) Want of discipline, or scarcity of ventilation, had in many cases been the cause of explosions, as would be seen by the reports of the inspectors, particularly the breach of the general rules 1 and 4. (12.) Coal dust added much to the danger of explosions, as was shown repeatedly in the reports of the inspectors for South Wales and Yorkshire. (13.) Some of the explosions would not have happened had safety lamps been used. (14.) Upcasts should be kept dry, as was seen by the occurrence at Pillowell Level Colliery, Forest of Dean. (15.) Fires and furnaces should not be placed underground, as was shown by the same occurrence.

Mr. Joseph T. Robson (South Wales Inspector) remarks that, with

one exception, the explosions in his district, both fatal and non-fatal, occurred in mines where naked lights were in general use, and states that : " Most of them would certainly not have happened if safety lamps had been used, but many owners and managers are still averse to the introduction of safety lamps, because the quantity of gas generated in the naked light collieries is comparatively small to that in most of the collieries worked exclusively with safety lamps. These owners and managers rely on the ventilation and the inspections by their subordinate officers, and have an impression that a dangerous quantity of gas is not likely to be met with. The prohibition of naked lights under the eighth general rule cannot be enforced by an inspector, unless he can prove that there is likely to be such a quantity of inflammable gas as to render the use of naked lights dangerous. Now, similar conditions exist in mines worked with naked lights as in those where only safety lamps are used ; the ventilation is conducted on the same principle, and is equally liable to temporary derangement whereby gas may accumulate. The small explosions which occur are, in my opinion, sufficient proof of the likelihood of gas being met with. Then, as to the ' dangerous quantity,' it seems to me that where the system has failed, and an explosion, resulting in serious personal injury or loss of life, occurs, this also is proof of the danger, and that only safety lamps should be used. This view of the matter has not, however, been upheld in cases of prosecution in other districts, and I have not, as yet, thought it advisable to recommend proceedings under the eighth general rule. I am confident that safety lamps will become more and more into use as a precautionary measure, which, of course, is their only legitimate purpose."

Among the safety winding appliances exhibited at the Paris Exhibition may be mentioned the Villiers Safety apparatus, which is thus described :—

The object of this appliance is to prevent all accidents from over-winding, whether the speed be too great on arrival, whether the banksman makes a mistake in the direction on starting, or indeed under any circumstances. The effect is, progressively, and in an automatic manner independently of the banksman, to reduce the speed of the winding engines (the momentum of which is frequently excessive owing to the weight of the ropes being often very great) and to bring the cages to rest without shock, should they pass the landings. Such an appliance has given good results at the Jabin shaft during the last three years, and a second has been put up at the Verpilleux shaft.

To bring about this result the winding engines are fitted with a brake of progressive action, capable of moderating the speed during a certain period, and of causing complete and instantaneous stoppage at a given moment. This double-acting brake, worked by a slide within reach of the banksman, is put on by a weight suitably circulated, and taken off by compressed air admitted below a piston.

The compressed air, admitted above the same piston, doubles the energy of the appliance, which thus, from being simply a moderator of speed, then becomes a means of complete stoppage. The use of compressed air is preferable to that of steam, which is liable to condensation, and therefore, being evacuated with difficulty, renders the putting on of the brake too slow. The counter-weight brake guarantees against accident owing to the bursting of a pipe, because in such a case, like the air or vacuum automatic railway brake, it acts immediately, and clips the brake pulley. In order to avoid producing a too great and therefore dangerous effort on the brake, care is taken, when admitting compressed air on the top of the piston, that it be of constant pressure, which it is possible to obtain by a reducing valve. The brake, on working, at the same time closes a steam stop-valve, between that worked by the banksman and the boiler. The valve, however, although closed, allows a certain defined amount of steam to pass, so that the engines may have some to work with on the brake being taken off. Besides this the engines are provided with a *servo-moteur*, or steam starting and reversing gear, by which this latter operation is effected with little effort. The starting lever of the *servo-moteur* acts as the slide to a vertical catch or trip, articulated to a rod sliding on the reversing lever, which is operated by the *servo-moteur*. This rod participates in the vertical motion of the catch, and in the oscillating motion of the reversing lever, in which movement its lower end might, if not raised, draw along any object placed in its way. With this addition the engines may be slowed with certainty.

Water Columns.—A new form of pipe for conveying iron-destroying fluids, such as acid mine waters, sulphuric acid, wood pulp from digesters, etc., is now manufactured under the patents of J. C. Bayles of New York. The steel-armored acid conduit is a light and strong steel pipe, built up of sections of such shape as to give it the maximum strength and stiffness, and provided with a lining of rolled lead, so held in position between the externally projecting longitudinal flanges that it cannot collapse or become displaced. The combination of lead and steel thus secured meets the requirements of service in the conveyance of fluids which do not attack lead, but which need to be handled under pressures which lead pipes will not carry. This principle of construction is applicable to various diameters and shapes of pipe, and admits of the use of any weight of metal needed to give the strength required in engineering practice. The steel-armored acid conduit is claimed to make a good pump column for mines from which sulphurous water is discharged: and in other positions where strength and stiffness are needed and a lead lining has value, such a combination pipe would seem to have utility. All forms of lead-lined couplings and special fittings are provided, and full guarantees are offered by the manufacturers as to strength of tubes and tightness of seams and joints. The rapid destruction of iron pipe by sulphurous waters entails so great a cost upon the mining and manufacturing industries of the country that this light and strong acid conduit is an

important addition to the materials at the command of the engineer. The pipe is made by the Spiral Weld Tube Company of East Orange, N. J.

Fires in Mines.—The following editorial from the *Colliery Guardian* is of interest to all mine managers who are compelled to leave masses of coal under ground :—

“ This subject is frequently under discussion at meetings of mining institutes throughout the country, and further information is eagerly sought by mining engineers who have daily to face difficulties arising from gob fires, for it is not generally known how large a number of mines have this danger constantly present in them. The matter will receive fresh interest from the recent disaster at Longton, which has been attributed to spontaneous combustion, or what mining men usually call “ gob.” The original cause of a gob fire is often a mystery. Frequently it results from the oxidation of iron pyrites, which occurs in thin bands, balls or strings so finely distributed that not only is the coal rendered useless commercially, but the pyrites is also useless in itself, as it cannot be separated from the coal at a price to pay for the labour expended. Where the pyrites is found in large pieces it is separated from the coal, and finds a ready market at the chemical works. Living as we do in an age when residuals represent a large item of profit at gas and iron works, it might be found profitable to send out the pyritous coal, and by crushing and washing separate and convert the one into acid and the other into briquettes or coke.

“ But this would not in all cases obviate gob fires, as the pillars of solid coal which are left at stated intervals in all mines worked on the stoop-and-room or pillar-and-stall system, and also more solid blocks of coal on the sides of main roadways, are liable to become ignited by the excessive friction resulting from crush, grinding or creep of the roof and floor. Thus a solid pillar of coal left as a fire barrier or to effectually exclude air from a gob already heated or on fire has often been so crushed by the weight of the superincumbent strata that the friction of the particles of coal and pyrites against one another have ignited the coal, causing a fire of greater intensity than the original one. That owners recognise the importance of having the best advice in such cases is frequently exemplified in advertisements for managers where the fact is stated that the applicants must have a practical knowledge of how best to work mines liable to gob fire. This, on the principle that prevention is better than cure, yet there is no invariable rule by observing which a manager can keep the mine under his charge absolutely safe from gob fire.

“ Under the head of prevention, ventilation takes the leading place, and that in two forms ;—(1.) By having a large current of air, and (2) by having the smallest current possible to keep the gob clear from gas. The large current will be cool and dry, whereas the small current is certain to be hot and saturated with moisture. The former

tends to lower the temperature of the gob and the latter to increase it.

“It has been noticed in the case of mines ventilated by furnace and where the fires are let down at week ends and holiday times, that the frequency of the gob heating has been very marked, and also that where fan ventilation has been substituted for furnace, gob heating has decreased in frequency. The improvement effected by the latter system is the result of a more regular current of air, which keeps the surface of the gob dry, whereas with a sluggish current the air becomes saturated with water, which is deposited on the gob in the form of dew and afterwards covered up by the colliers, thus providing the conditions necessary to spontaneous combustion. A small current should therefore not be adopted unless a gob fire already exists, a good dry air current being the best preventative, coupled with care in the day-to-day management of the mine.

“A question arises, however, as to the direction of the air-current. If we follow the rule generally accepted, the air-current will travel continuously up-hill until it reaches the highest point, and then return as directly as possible to the up-cast. By following this rule the heat created by fermentation in a gob at the bottom of the hill would be carried upwards from gob to gob, and always increasing; the tendency of the air pressure being to force the heat upwards from gob to gob through the gob, and not by the open airway. Thus, starting with a cool and dry air-current at the lowest point, the gob at the highest point of the workings would naturally be very hot and very damp, and in a condition to foster a gob fire. If on the other hand the air current is brought downhill—*i. e.* from the highest point to the lowest—the tendency will be for each gob to exhale its own heat into the main airway, and thus all the gobs from the highest point to the lowest will be of a more uniform heat.

“When a gob has developed a fire it is necessary to do something to put it out, and the usual—indeed, often the only—course is to make close stoppings, but in spite of care and ingenuity in their construction there is no case on record where this method has been effectual in actually smothering a gob fire. In fact, a fire once started seems almost to require no more oxygen to foster and propagate it. Mr. Wardle, in his *Reference Book* for colliery managers (third edition), page 250, gives directions for putting in fire stoppings with safety, the principal of which is to always commence with the outlet and not with the inlet. Water has often been tried, but if it is not applied in large enough quantities to completely deluge the gob it is worse than useless. In small quantities it feeds the fire, becomes decomposed by the red-hot cokes, and feeds the fire with its component gases—oxygen and hydrogen. Not only so, but water sparingly applied carries air to the fire, which it forces to the outside and surface with surprising energy.

The most effective way to deal with a gob fire if it is localised is to dig it out. This requires great care when firedamp is pre-

sent, as the following incident will show:—A small area of coal has been left by a colliery lessee as worthless, but the lessor's agent being of the opposite opinion demanded that a royalty of 10d. per ton should be paid or the coal gotten. The terms of the lease being based on a tonnage royalty, the lessee considered that it would be cheaper to work the coal out than to pay for it or submit to arbitration. The mine was a thick one, with an inclination of about 1 in 4, worked on the pillar-and-stall principle, and had a good roof, hence it was decided to make a road through the old gob. Work proceeded smoothly for some time until it was discovered that the gob was getting hotter day by day the further it was dug into, and at last it was found to be of a dull red heat and only waiting for a sufficient supply of oxygen to break out into flame. The ventilating current was checked and only sufficient air permitted to pass to keep back the firedamp which filled the workings above. A trained man was stationed above the ordinary workmen to watch the gas and to give prompt warning of any danger. In spite of this, on one occasion the gas suddenly descended in large volume, the Davy lamps being filled with blue flame; one man unnerved tried to blow his wick flame out, but providentially the gas tumbled him down senseless, and no man ever received scunter consideration or help from his fellow colliers. Thus the want of nerve or judgment on the part of one man came within measurable distance of creating a fearful disaster, and how many of the recorded colliery calamities have been caused by similar indiscretions no one but those connected with mines can imagine.

“When digging out a gob fire, the safest way is to supply the men with fresh air by means of Denayreuse air tubes, which in no way hinder them in their work, but enable them to do it with comparative comfort and great safety to the mine and their own health.

“Carbonic acid gas (CO_2) has been recommended as a safe means of extinguishing gob fires, but it is very difficult to apply, and when applied would probably be utterly useless as the heated coal would immediately add another atom of carbon and convert it into carbonic oxide, which would burn and be again converted into carbonic acid (CO_2). The aim in building off a gob fire is to smother it by means of the carbonic acid gas supposed to be produced, but unfortunately the gas which comes to the surface is not carbonic gas only, but also carbonic oxide and coal gas, produced by the distillation of coal slack, and, hence, the return ventilating current of a mine possessing a gob fire has a peculiar odour which cannot be mistaken. Air thus charged is very unhealthy, poisoning the blood and producing sickness and headache. If a gob fire gets such headway as to create a large volume of smoke, the danger is very great indeed, for should flames appear, the smoke, being principally the product of the distillation of coal, will at once explode. Explosions of this class happened at Whitfield and Baddesley collieries. Those who cannot realise the possibility of such occurrences may have their doubts removed by watching the gas which is drawn from the top of either open or close-topped blast fur-

naces burning under the boilers or under the kilns after receiving a proper admixture of air.

“Although, as before observed, gob fires are so common, yet no rules of the Mines Regulation Act or special rules directly apply to them, and the question may be asked, Is a gob fire “an open light?” If it is not it may quickly become one. For instance, in the case of a mine troubled with a gob fire which was carefully built off and in a quiescent state, the deputy passing up the face of work on his last round one Saturday found all right, but within a quarter of an hour the under-viewer wishing to meet the deputy passed along the same face and found a prop which had about 2 ft. of dirt against it actually blazing at the foot. This incident only shows that gob fires cannot receive too much attention, and that disaster may result even if every possible means is used to protect the mine against them. In conclusion, it may be well to observe how the Mines Regulation Act, 1887, bears on this question, considering that a gob fire in a locked safety lamp mine is an open light. Rule 1.—That the amount of ventilation shall dilute and render harmless noxious gases. Rule 8.—No lamp or light other than a locked safety lamp shall be allowed or used. Rule 7.—If the person for the time being in charge of the mine or any part thereof finds from any cause whatever that the mine or any part thereof is dangerous, every workman shall be withdrawn from the mine or part so found dangerous, and afterwards such part shall be inspected by a competent person, and a special report made in a special book provided for the purpose; and under section 42 an inspector may require any matter that he finds dangerous to be remedied even if it is not expressly prohibited by the Act.”

SCHOOLS OF INSTRUCTION FOR MINERS.

Under the provisions of a Minute of Council passed December 15th, 1888, the following persons were appointed instructors for their respective districts. The appointments were dated January 1st, 1889.

Cumberland County.

James Baird—Chignecto Mines, Maccan.
Robert Redpath—Springhill Mines.

Pictou County.

J. G. Rutherford—Stellarton.

Cape Breton County.

Robert Robson—Sydney Mines.
Robert Anderson—Cow Bay.
John Weir—Victoria Mines.
Hugh Campbell—Old Bridgeport.

These gentlemen were authorized, subject to the approval of the Hon. Commissioner, to procure proper rooms for teaching, and were provided with a compass, chain, and a set of plotting instruments, which were to remain the property of the department. No restrictions as to text books or modes of instruction were laid down. As most of the instructors had undergone examinations at the hands of the board of examiners, it was considered that their personal experience in this respect would prove the best guide.

An examination was held simultaneously at Spring Hill, Stellarton, and Sydney, July 17, and the papers considered at a meeting of the board held at Stellarton shortly after. There were papers submitted by fifty-nine candidates. The following passed as underground managers :—

Alex. McDonald—Cow Bay, Cape Breton.	
Jno. Carey—Sydney Mines,	"
D. H. Ferguson—Victoria Mines,	"
Isaac Greenwall	"
S. F. Lee—Little Glace Bay,	"
Bart. Connors—Victoria Mines,	"
Edw. McPhee—	"
Archie Ferguson—	"
G. H. Greenwall—Sydney Mines,	"
Hector McKinnon—Stellarton,	"
A. D. McKenzie—Vale Colliery,	"
Henry McCarter—Stellarton, Pictou Co.	
Alex. McDonald—	"
Thos. Blackwood—Westville,	"
Wm. Lormier—Chignecto Mines, Cumberland Co.	
Chris. Hargreaves—Springhill,	"

The following received certificates as overmen :—

R. B. Crosby—Cow Bay, Cape Breton Co.	
Murdock Morrison—Cow Bay, Cape Breton Co.	
Chas. Young—Sydney Mines,	"
Edw. Lockman—	"
M. Sullivan—	"
Dan. Brown—	"
Jno. Dorsay—	"
Thos. Johnstone—Bridgeport,	"
Jno. Caddigan—	"
Alex. Cameron—	"
Donald Ferguson—Victoria Mines,	"
Alex. McAskill—	"
W. H. Nicholson—Stellarton, Pictou Co.	
A. Babine—Chignecto Colliery, Cumberland Co.	
Chas. Rennie—Springhill,	"
Arch. Ferguson—	"
Wm. Matthews—	"
Geo. Yarrow—	"
A. B. Welson—	"

Pursuant to an order in Council passed Nov. 1st, 1889, the following instructors have been appointed and are now engaged with their classes :—

Cumberland Co.

William Wilson Springhill.

Pictou Co.

James Maxwell Westville.

Thos. Blackwood (assistant).

J. G. Rutherford Stellarton.

*A. D. McKenzie Vale Colliery.

Cape Breton Co.

John Cleary Sydney Mines.

John Wier Victoria Mines.

Hugh Campbell Old Bridgeport.

John Johnston International Mines.

S. F. Lee Little Glace Bay Mines.

R. D. Anderson Cow Bay.

In a similar manner it is proposed to change the schools from locality to locality as the number of pupils permits in order that in rotation all districts may have the benefit of the instructor's work. The expenditure under this head last year was \$2647.14, which should not be exceeded again, as considerable expense was incurred in fitting out the instructors with instruments.

The following are the questions asked at the Examination of last season :—

I. MINES REGULATION ACT.

1. State what you know of the Act in regard to the prohibition of single shafts, and state under what conditions they are allowed, and by whose authority ?

2 State what notices have to be sent to the department of Mines, detailing each under its proper heading ?

3 State to what extent the Inspection of a mine can be carried, and by whom ; and in case of a fatal accident, what power has the Inspector ?

4 State the requirements of the Act as to ventilation, inspection of working places, and give the time during which inspection must be made ?

5 State under what conditions workmen must be withdrawn from a mine ?

* Since died. H. McCarter appointed in his place.

6 State under what conditions, and when it is necessary, that safety lamps should be used?

7 State fully under what conditions gunpowder may be used, both before and after inflammable gas has been discovered in a mine?

8 State what the Act requires of places being driven towards an accumulation of water?

9 State the requirements of the Act as to the securing of roofs and sides.

2. VENTILATION.

1. What is fire damp, where is it met with in coal mines, what are its dangers, and how is it rendered harmless? What is choke-damp, where found, what are its effects on human life, and what is its relative weight to atmospheric air?

2 Under what circumstances can furnace ventilation be recommended, and when would you prefer a fan?

3 Describe the different methods of measuring air, and at what velocities will safety lamps of ordinary make become unsafe?

4 State what sized air-way you consider proper for a non-gaseous mine in which 200 men are employed, assuming the length of the air-way at one mile? Give your reasons for the size you name.

5 What is meant by Brattice? describe its construction; and if using it, state on which side you would have your intake, supposing a place 9 feet wide, and the Brattice to be 3 feet from the rib?

6. If you found in a mine under your charge a large body of fire damp, how would you proceed to remove it, and what precaution would you take in so doing?

7. Describe a regulator, an air-crossing, and 'splitting the air,' and of what value are they in coal mines?

8. If you had 50,000 cubic feet per minute, and wished to increase it to 80,000, how much would you have to increase your power?

9. In driving your levels away from the pit bottom, and you met with a good deal of gas, and not having either furnace or fan, what would you do to help you out until one or the other were ready?

10. If you have 25,000 feet of air passing with a water gauge of 1 inch, what would pass with a water gauge showing $2\frac{1}{8}$ inches.

3. MODES OF WORKING COAL.

1. Describe fully how you would sink a shaft for the first 50 feet through sandy soil, with reference to timbering, pumps, and surface arrangements ?

2. What size of pillars would you have at depths of 200, 500, and 1000 feet, and what width would you make your boards ? Give your reasons.

3. What do you know about underground haulage, especially along levels ?

4. Under what circumstances would you be prepared to advise robbing pillars in flat and pitching seams ?

5. In driving levels in a flat seam, you meet with a down throw fault of 18 feet, how would you proceed to regain the coal ?

6. On reaching the coal in a shaft 600 feet deep, what size would you make your shaft pillars, width of levels ? and state how far you would drive your narrow work before you laid off any rooms.

7. If your roof was soft and shelly, give a free hand sketch of how you would timber it.

8. If you had a slope 2,000 feet long, dipping 8 inches to the yard and had a gross weight of tubs and coal=10 tons, what size and quality of rope would you use ?

9. Give a free hand sketch of a section of a pit working board and pillars, giving size of openings and pillars under a cover of 400 feet.

NOTE.—All the above questions for Underground Manager's paper. Any six may be selected for Overman's paper.

4. SURVEYING.

1. Write out in the form of a field book, the following survey :—

Start at A, thence N 35° E, at 1 chain
head 6 lks to left, at 2 chains 70 lks.
reach Station B, head 7 lks to left ;
thence N 83° 30' E 1 chain 29 lks. to
Station C ; thence S 57° E at 50 lks
head 6 lks. to right and 6 lks to left, at
1 chain 50 lks. head of slant 5 lks to
left, at 2 chains 22 lks. Station
D ; thence S 34° 15' W, at 3 chains
fault running North and South
at 3 chains 55 lks. Station E.

2. Plot the following :—

N 35° E 270 feet, thence
N $83\frac{1}{2}^{\circ}$ E 129 feet, thence
S 57° E 222 feet, thence
S $34\frac{1}{4}^{\circ}$ W 355 feet, thence
N $56\frac{1}{2}^{\circ}$ W 323 feet.

3. How would you ascertain the position of any part of a mine in vertical relation to objects on the surface, the seam being inclined at an angle of 15° ?

4. What precautions would you take in checking a survey made many years ago by the magnetic compass ?

5. How would you test a magnetic compass to see if it was accurate ?

5. GENERAL SCHOLARSHIP.

1. Multiply .3145 by .07854.

2. A place 5 feet by 7 feet is paid \$4.60 per running yard, what would it cost per cubic yard?

3. An anemometer gives a speed of 320 feet in 36 seconds in a place 9 feet by 6 feet, what quantity of air passes in a minute ?

4. A steam pipe of $3\frac{1}{2}$ inches diameter has to be replaced by one of double the area. What would be the diameter of the new pipe ?

5. A water pipe 12 inches in diameter, has 96 feet of water standing in it, what is the weight on a square inch at the bottom ? a cubic foot of water weighing 62.5 lbs.

6. A man mines 3 cubic yards a day in a level 5 feet by 12 feet ; how long will it take him to drive a distance of 15 feet ?

7. Three men worked in a place that is paid \$113 ; A worked 26 days ; B worked 18 days ; C worked $23\frac{1}{2}$ days ; how much comes to each ?

8. A duplex pump having plungers $5\frac{1}{2}$ inches in diameter with 18 inch stroke, makes 40 single strokes per minute. How many gallons does it discharge in a minute ?

GOLD.

The total returns for this year show that 39,160 tons of quartz were crushed, yielding 26,155 ounces of gold for 211,548 days' labor, compared with 22,407 ounces of gold from 36,178 tons of quartz for 163,772 days' labor. These results are encouraging as showing an increase over last year's work, and as being the largest returns since the first year 1862, except the year 1867 when the yield was 27,314 ounces from 31,386 tons for 218,894 days' labor.

From the results of the year's work it is anticipated that the year 1890 will see a still further improvement.

The total receipts from gold were :

Prospecting licenses.	\$15,358.08
Rents (Leases.).....	6,055.00
Royalty.....	9,959.25
	\$31,372.33

The following statement shows these results by counties :

PROSPECTING LICENSES.

Queens	\$4,596.49
Halifax	4,443.97
Hants	2,389.42
Lunenburg	2,267.41
Guysboro	662.01
Yarmouth	457.89
Other counties ...	537.89
Total	\$15,358.08

RENTS (LEASES.)

Halifax	\$18,14.50
Queens.....	1,388.00
Lunenburg.....	1,176.00
Hants	1,035.50
Guysboro.....	450.50
Yarmouth.....	66.50
Other counties.....	124.00
Total.....	\$6,055.00

GOLD ROYALTY.

Halifax	\$4,066.37
Queens	3,072.10
Hants	1,734.77
Guysboro	909.73
Yarmouth	94.99
Lunenburg	81.39
Other counties	
Total	\$9,959 35

SURVEYS—GOLD.

During the past season a large number of surveys have been made for the Department of leased areas. At Montague several surveys were made by Mr. F. W. Christie, and stone monuments placed at the common corner of areas 1048, 1047, 1152 and 1153, the north-west corner of the "Lawson" property, at the common corner of areas 1447, 1448, 1552 and 1553, and at the common corner of areas 1434, 1435, 1565 and 1566. The latter is on a corner common to the "British American" and "Sutherland" properties. He was also employed to lay off in the beginning of the year the Ardoise district where ground had been taken up over a long stretch of country.

In connection with a dispute in the Eastern part of the Leipsigate gold district, known as the Fralic dispute, Mr. Christie and Mr. J. W. Wentzell were employed to locate the Prospecting License which had been applied for by metes and bounds in its true relation to the lines of the district as already settled. In May Mr. Christie was sent to Tangier in pursuance of a recommendation of the Committee of Mines and Minerals to ascertain the extent of an alleged irregularity in the office plans. He reported that originally the distinct blocks of ground applied for had been projected and connected on the office plan without a preliminary connecting survey. He was also employed in making surveys at Rawdon, and assisted in Inspection work, and in collecting information for this report.

Mr. J. W. Wentzell of Bridgewater made surveys of areas at Liverpool Road, Blockhouse, Gold River, Pleasant River, Rudolph's Brook, and Vogler's Cove.

Mr. S. Smith was engaged in Queens County in making surveys at Whiteburn, Westfield, West Caledonia, Brookfield, and Malaga.

Mr. C. W. Pye of Sherbrooke made surveys for the Department at Ecum Secum, Redhead, Doliver's Mountain, Quoddy, and Lochaber.

Mr. J. F. Anderson and Mr. J. McKenzie also did some survey work for the Department.

HALIFAX COUNTY.

This county has within its boundaries a large number of mines and many of the older districts. The improvement in the output of these mines, the success attending efforts to recover old workings, the good ore found in the old mines, and the improvement in the methods of mining, are subjects for congratulation to the gold-mining industry. Although foreign capital has not been attracted in any great extent to these mines, there has been a very encouraging advance in values, and an increase in the confidence with which the properties are regarded by their owners and operators. The expected increase in the output for the coming year is justified by the present condition of the mines and the extent of working ground open.

Montague.—This district is again enjoying a period of prosperity. The year's work and the outlook of the mines are very satisfactory. The Annand mine has yielded large returns and some remarkably rich ore. This mine has now a large extent of workings open, and an extensive mining plant. The Rose mine was re-opened, and a large body of rich ore found. Some work was done by tributors on the Kaye-Symonds property. Some tribute work was done on the Montreal property, and a large amount of prospecting throughout the district. The returns show a maximum yield of $26\frac{1}{2}$ ounces to the ton, and an average of nearly 2 ounces.

Caribou.—This district has improved. The "Lake lode" property has produced regularly, and has had plenty of ore. At the Caffrey mine, exploration work has been the bulk of what was done. On the Heatherington property a lead was opened by putting down several pits, a number of mine buildings put up, and the construction of a crusher commenced—to be finished next season. On the Dixon areas underground work has been vigorously pushed; a very promising lead developed, and a new crusher built on the property. During the coming year there will be four crushers available for work. With the present facilities, a great advance should be made during 1890, and a large output returned.

Waverley.—A large amount of development work has been conducted by Mr. Hayward on ground on the American Hill district, and several thousand of tons of milling ore have been blocked out. A search has been continued in East Waverley for the barrel quartz. Mr. Wilson worked on the West side of Muddy Pond, and some work was done on the Palgrave areas. On the starting of the new mill, a steady return may be counted on for some time.

Lake Catcha District.—The Oxford Co. have confined most of their operations during the past year to prospecting. They drained Lake Catcha and discovered several leads in its bed, and have commenced developing one. The swamp in the centre of the property was also drained, and a prospect trench of about three hundred feet shows

the existence of over fifty leads aggregating thirteen feet of ore, all of which is gold-bearing. On one of these leads work has been progressing for the past three months.

A roll was discovered on the Coleman lead near the east end of property, which promises well. The Company have discovered over one hundred leads on their property, and find indications of several more.

The total returns to date show a yield of thirteen thousand three hundred and sixty-three ozs. from 9,728 tons ore.

Jno. H. Anderson has done considerable prospecting on his western areas, and discovered several leads showing gold, on one of which he has commenced development.

Some work was also done on the Cambridge and Cogswell areas.

Fifteen Mile Stream.—The returns show 3,634 days' labor, 1,416 tons of quartz crushed, and 786 ounces of gold. The Egerton Company has worked steadily, and at the close of the year arrangements were made for its transfer to a larger Company, to be under the superintendence of one of our most experienced gold-mining engineers.

Moose River.—This district has returned about the same amount as it has for several years past. The yield has been fairly steady, without much fluctuation. Mr. McGregor is working one portion of the Moose River Gold Mining Company's property, and Wm. Bruce another. Mr. Touquay has worked regularly on his property, —a special feature of his work being the working of large quantities of alluvium by the crusher.

Salmon River.—Pending transfers of interests of the Dufferin Company, the work on the property has not been energetically pushed. The appearance of the mine and ore is satisfactory, and an extension of the work during the coming year is anticipated. The mining plant continues to give satisfaction, and the size of the village about the works is increasing. The returns show 2032 ounces from 7633 tons of quartz, the total returns to date being 33200 ounces from 73,041 tons of quartz.

Tangier.—This district has made no progress during the last year. Work to a limited extent was regularly carried on at Strawberry Hill. John Murphy and others worked in different places in old Tangier. Prospecting was carried on to some extent at Mooseland.

Beaver Dam.—A large amount of prospecting has been carried on here with gratifying success. A number of leads showing well have been opened up, and the erection of a large crusher will be commenced during the ensuing year.

Lochaber.—Work in this district has been limited to development, exploration and testing. The Lochaber gold mining company have a steam mill and hoisting works.

Harrigan Cove.—This district has now a good steam mill, but the past year's work has been confined to prospecting. The McMann property and crusher have been bonded to purchasers, and a resumption of work is looked for soon.

Ecum Secum.—Some mining was prosecuted with fair results at this place, and a good deal of prospecting.

Lawrencetown.—The discovery of a rich lead was reported from Lawrencetown during the summer, and considerable prospecting was carried on.

Killag.—In fall of 1888 the result of the prospecting, which had been carried on for several years, was to fix the position of the vein yielding so much rich drift under a large swamp. During the past season hoisting plant, pumps, etc., were prepared and a shaft pushed down through 25 feet of quicksand, and sunk 35 feet in the solid, a cross cut driven 60 feet, and the long sought-for vein proved. The vein is 10 inches wide and bedded in talcose slate. Some tons of ore, estimated to be good for $2\frac{1}{2}$ ozs. per ton, were taken out. A crusher has been put up, and other necessary buildings, etc., and it is anticipated that next season good returns will be realized.

QUEENS COUNTY.

Mining work has been very brisk in this section, with a large amount of building and development work going on. The yield of gold has been satisfactory, and a large output is expected in the season of 1890. A number of new mines have been opened, and several new crushers will be started in the coming season. Roads to the different mines have been built or repaired, telephone facilities increased, and means of travel and freighting extended by the establishing of steam ferries in the lakes near Malaga Mines, and stage lines to the different mines, and to points on the Nova Scotia Central Railway. The gold mines in the county are attracting the attention of foreign mining investors, and business of all kinds was greatly stimulated by the hopeful and encouraging tone of the gold mining industry. Prospectors and explorers were very busy searching for new places.

Malaga Barrens.—The returns show 3976 ounces from 4388 tons of quartz, an average of 18 cwts.

This district is the most important in the country, and has made rapid progress. An agent of the Department of Mines examined the district in the summer of 1886, the year of the discovery of gold in the place. There were then no persons permanently residing in the locality, and no habitation but a tent. The population of the Mines is now estimated at 500. A school house has been built, stages run daily to Bridgewater and Caledonia, and in the summer there

are two small steamers making daily trips to the Mines. There are now four crushers in the district with a total of 65 stamps, and another mill will likely be built in 1890. The Malaga Mining Co. are operating four mines principally by contract, and a twenty-stamp crusher. The Minneapolis crusher has not been running this year on account of litigation about the affairs of the company. The Parker-Douglas Co. have been pushing work during the season, added to the number of their stamps, and remodelled their hoisting works. They are using air drills in their pits. The Caledonia Co. in the eastern part of the district, have done a large amount of development work in opening up several veins, and finished a very complete mill, combining crusher and hoisting works. The Boston Mining Co. have purchased a large tract of areas, and have been fortunate in finding very promising ore in several veins on their property. They expect to put up a crusher and hoisting works during the coming season. The outlook for the business of the district for 1890 is very encouraging and a large output is expected.

Brookfield.—The returns show 1796 ounces from 1472 tons; an average of 1 oz. 4 cwts. The principal work in the district has been carried on by the Philadelphia Co. who are now operating two mines, one on the Dunbrack Lead and one on the Nelson Lead. The Philadelphia Co. had been using the mill of the Brookfield Mining Co., but during the year finished a very complete mill on their own property conveniently situated to handle the ores from the two mines. Although these mines have necessarily been largely employed in development work the output has been very satisfactory, and now that they have such a complete plant next season's returns are expected to be large. It is to be regretted that the Brookfield Company's works are closed, but it is to be hoped they will resume work next season. A large number of areas are held in this district, but prospecting work is only done by spells, and if a more determined effort is not made to develop the areas the district must necessarily have but few working mines.

Whiteburn.—This district has continued to be a fairly steady producer, although the yield has decreased a little. McGuire & Co. were working two veins, but closed down at the end of the season. It is expected that the mine will be furnished with new and more extensive plant, and resume work in the coming summer. The Whiteburn Mining Company worked on several veins and did a very fair business, and handled a good quantity of ore in the mill. Some prospecting was carried on, but the expectation of the opening of mines in the southern portion of the district was not realized.

The returns show 2440 ounces from 1639 tons of quartz.

Other places.—Prospecting was carried on at West Caledonia, Fifteen Mile Brook, Greenfield and at some other points where gold has been discovered, but although some rich boulder drift was found at West Caledonia, and Fifteen Mile Brook no mines have been opened.

GUYSBORO.

Mining business in this County is improving, and the outlook is encouraging.

Goldenville.—This district is reviving, and the work of the past year has been profitable. The owners of some of the old properties contemplate re-opening the workings, most of which in the past yielded very profitable returns. John H. McDonald has been working low grade ore with so much success that he expects to work a much larger amount during 1890. Mr. Williams and associates have re-fitted the mill and hoisting gear on the property adjoining the Palmerston, and intend to put out a large amount of the low grade ore on the areas. Robert McNaughton has met with very encouraging success in developing a property at the eastern end of the district, and has put up a number of buildings. There has been the usual tributing in the district during the season, and a large amount of tailings has been re-worked. A good return may be expected from the work of 1890.

Cochrane Hill workings have been again closed down. At "Crow's Nest" a company are at work developing the Fraser areas. A tunnel was started into at the foot of the hill on the Fraser lead, with the intention of driving on the course of the lead until the main shaft was reached, and thus open up a large amount of stoping ground. A cross-tunnel was driven from the main tunnel to cut several veins lying to the northward of the Fraser lead. A large quantity of ore for stoping will thus be "blocked-out" in the most advantageous position for easy working.

Wine Harbour.—The most important work in this district has been on the Middle lead. The old Eldorado mill was dismantled and a new mill put up to crush the Middle lead ore. Malcolm Cameron and others have worked a number of tributes throughout the district. The great scarcity of fuel in the locality has greatly hindered mining work. Parties prospecting in the district have met with fairly good success.

Stormont.—The principal work in this district has been at the Island mine at Isaac's Harbour. This mine has worked steadily, and yielded large returns. H. K. Fisher put machinery on the North Star property, on the west side of the harbour, in December, for the purpose of reopening the pits. There has been but little tribute work in the district. At Country Harbour Narrows some work was done on the Johnson's Brook properties, and it is claimed that a large belt of valuable low grade ore was defined. A discovery of rich ore was reported as found at the Narrows.

LUNENBURG COUNTY.

There are no special features to be noticed in the gold mining operations in this county. Work has been nearly confined to Gold

River, Millipsiget, and Pleasant River. The old districts of Indiau Path and the Ovens are still idle.

Gold River.—This district has not been a large producer, but development work has been very largely carried on, especially at the Neptune Mines. A complete system of shafts and tunnels is in process of development at the Neptune Mines, and a large quantity of ore, estimated to be of good value, has been "blocked out." Some rich outcrops of ore on the Neptune Mines and other properties have been struck, and the proprietors are very confident of doing a well-paying business in the future. There are two mills in the district, with a total of 30 stamps.

Millipsigate.—The Owen property at the "Bluff," and the mill, were operated for a time. A pit was put down to intersect the vein from the Bluff. Considerable prospecting was done all over the district, and some very good ore was found and some veins sunk on to a limited extent. There are a large number of veins known in the district that look well and warrant attention. The district is conveniently situated and the rock usually mines easily.

Pleasant River Barrens.—In this district considerable work has been done, although, for want of a mill, no gold has been produced. Messrs. Thompson and Newcombe have built a large and complete mill near the site of the mill that was burnt down. They have fitted up to work the old mine, and have opened a mine on a lead to the westward of the mill. They have a pile of good-looking ore, and feel confident of doing a prosperous business.

HANTS COUNTY.

Work has been carried on at Central Rawdon, Old Uniacke, South Uniacke and Renfrew, regularly during the season, and the returns have been very profitable.

Central Rawdon.—This district has given remarkable returns of gold. The character of the veins and the geology of the locality differ from those of the general class of mining districts throughout the Province. The rock works with remarkable ease, and mining is very cheap in the district. The first Gould-Northup property was bought by a company of Philadelphia capitalists, and more extensive workings were planned. The plant has been increased by a superior steam hoist and new boilers set up to work the mine and mill. Northup and his associates have opened up a property to the eastward of the old property and built a new crusher. This is a thriving district and is expected to yield largely during 1890.

The returns showed 2358 ounces from 925 tons of quartz.

South Uniacke.—Work on the "Withrow" areas has been carried on very energetically, there being now two mines working on the property. The eastern mine has produced steadily except when work

was confined to sinking the pits and "blocking out" stoping ground. A steam plant was put up on the "hulk" lead near the mill. Jas. Thompson and associates continue working the property lying east of the "Withrow," and erected a mill for crushing and steam hoisting gear to handle the ore. This district is expected to yield good returns during the coming year.

Renfrew.—At the Empress mine work has been carried on steadily. The cross-cuts to the Hay and Preeper leads were completed and a large body of ore was reached, the mine at the level of the cross-cuts being about 370 feet deep. The new water-mill on the stream was completed, and has been in operation a large portion of the season. This mill is supplied with improved batteries and feeders, and is claimed to have nearly double the capacity per stamp over the mills formerly built in this Province. The "Free Claim" property has been energetically and profitably worked this season. The crusher was put in repair, and a new water-wheel set up. Hoisting gear, operated by power from the water-wheel, was set up at the pits, and the property is operated entirely by water-power. The opening of other properties is under consideration by the owners.

East Rawdon.—It is to be regretted that these formerly productive properties have not been refitted since the fire that destroyed so many buildings and so much plant. The properties have been in the hands of an expert who has been testing the ore, examining the mines, and prospecting for new leads. There is a reasonable hope that these properties will be fitted up during the coming season.

Mount Uniacke.—Work in this district has been mostly confined to tribute work, and the re-opening and re-fitting of old pits. Messrs. Prince & Co. have been sinking on old ground, and have had good success in finding paying ore, and have made some encouraging returns. They are expecting to work on the basis of low grade ore. This district is expected to be a good producer during the coming season.

YARMOUTH COUNTY.

Mining has been dull in this county. Some work has been done at Kemptville, but the loss of the mill on the Kempt's property had caused serious delay. Some prospecting had been done at Chegoggin Point where a company are now putting up a large plant to work low grade ores on an extensive scale.

IRON MINING.

At Londonderry the returns show 40,823 tons of ore mined. A man was killed at this mine during the past season by moving from a cage in motion. The management have since taken additional precautions to make all shafts more secure for men riding in them. Mr. R. G. Leckie, formerly Managing Director of the Cumberland R. R. and Coal Co., has taken charge of these mines in place of Mr. Sutcliffe.

On the East River of Pictou two companies have commenced preparations for mining and smelting iron ore, viz., The Nova Scotia Midland Railway Company, and the New Glasgow Coal, Iron and Railway Company. The latter have turned their attention to the Limonite ores between Springville and Sunny Bræ, and Mr. R. E. Chambers has developed some fine bodies of ore. About 3,000 tons of ore have been taken out during the progress of his work. One point tested on the D. McDonald property showed 25 feet of ore of excellent quality. The Midland Company did some work on the Specular areas belonging to Mr. Holmes. At Newton Mills, Stewiacke, the large bed of red hematite was tested by Mr. Chambers, and about 400 tons of ore taken out.

At Brookfield, Colchester, about 1700 tons were extracted for use at Londonderry. The vein was found too narrow going East, but going West it was proved to have a thickness of at least 30 feet.

In the fall arrangements were made with a view to opening the Torbrook ores, in Annapolis county for use at Londonderry.

MANGANESE.

The returns show a falling off in the production of this mineral. Mr. John Stephens, of the Tenny Cape Mine, Hants County, returns a production of 81 tons of No. 1 ore, of which 36 tons (valued at \$2178) were shipped. An average of 5 men and 2 boys were employed.

Mr. Moseley, of Sydney, sold 31 tons from his Loch Lomond mine, guaranteed 90 per cent., and some highly crystallised. An analysis of the ore from this mine yielded the chemist of the Geological Survey—

Available per oxide manganese.....	91.84
Per oxide of iron .....	.12
Insoluble residue	2.11

I am not aware of any fresh discoveries of this ore of importance.

BARYTES.

The mines working during the year 1888 were not opened during the past season.

LEAD.

There is nothing new to report under this head. Some prospecting was done to the west of the Smithfield mines, in Colchester County and the owners of the Smithfield mine have taken out a lead ore lease.

COPPER.

No work of note has been done this year, the failure of the French Copper Syndicate having upset all basis of price, etc. At the Coxheath Mines the Eastern Development Company have, since the opening of their mine on what may be considered a working basis, turned their attention to preparations for building a railway and smelters. The County of Cape Breton has released them from taxation on all real and personal property for 25 years. At the mine a carpenter's shop, dynamite magazine and dry house have been put up. Below ground the shaft has been deepened about 50 feet, and more cross-cuts driven, which have proved the continuation in depth and quality of the valuable veins referred to in my last report. The ore extracted in the underground levels has been dressed, and the amount of ore now in stock is about 2000 tons.

During the summer explorations have shown a valuable vein about 1500 feet south of the present workings. This vein is about 10 feet wide and runs 17 per cent. of copper, and holds per ton 5 dwts gold, and $\frac{1}{2}$ ounce of silver. This discovery has added greatly to the resources of the company.

The returns show average number of men employed.

	No.	Day's Work.
Under ground Skilled Labor	12	} 6956
Laborers	11	
Above ground Skilled Labor	12	} 4872
Laborers	4	
Teamsters and Coalhaulers	—	

I remain, yours, obediently,

E. GILPIN, JR.,

Inspector of Mines.

LIST OF MINERAL LEASES (OTHER THAN GOLD).

No.	Lessee.	District.	Area Square Miles.
	COPPER.		
	ANTIGONISH COUNTY.		
2	Ross, McKay et al.....	.....	1
	CAPE BRETON COUNTY.		
105	Burchell, J. E.....	.....	1
106	} Eastern Development Co. { .....	.....	1
95	McKenzie, H. R., et al.....	.....	1
104	McKenzie & McKim.....	.....	1
94	Greener, John.....	.....	1
	HALIFAX COUNTY.		
1	McClure, Chas. F.	Gay's River	1
	COLCHESTER COUNTY.		
	Clarke, Howard	Smithfield	1

LIST OF MINERAL LEASES (OTHER THAN GOLD).—Continued.

No.	Lessee.	District.	Area Square Miles.
IRON.			
PICTOU COUNTY.			
44	Hudson, James.....	East River.....	1
43	".....	".....	1
	Cameron, N.....	".....	1
60	New Glasgow C. I. & R. Co.....	".....	1
47, 48, 49, 50, 51	Bartlett, J. H.....	".....	5
52, 53, 54	Townsend, W.....	".....	3
55, 56, 57, 58, 59	Ferguson, J. H.....	".....	5
CAPE BRETON CO.			
86	Brookman, S. et al. ..	N. Side East Bay.....	1
91	Brookman, S. L.....	East Bay.....	1
93	Brookman, S. et al. ..	".....	1
102	C. L. Ingraham.....	".....	1
103	A. McKenzie et al.....	".....	1
92	Matheson, D. et al.....	".....	1
84	Protheroe, Pryse	Cow Bay	1
INVERNESS COUNTY.			
16	Inverness C. I. & R. Co.	Whycocomagh	1
Total area under lease.....			34 square miles.

LIST OF COAL LEASES.

No.	Lessee.	Colliery.	Area Sq. Miles.	Working.	Agent and <i>Manager</i> .	Postal Address.
21	Bligh, James, et al.	CUMBERLAND CO.	1	.....	John Moffatt	River Hebert.
47	Boston C. M. Co. ....	.....	1	Working.	<i>Jas. Baird</i>	Maccan.
54	Cumberland C. M. Co.	Chignecto	4			
12	} Cumberland R'y & Coal Co.	Springhill	9	Working.	J. R. Cowans..	Springhill.
6, 7, 8, 44, 52, 55, 17		Joggins Joggins C. M. Association.. Joggins C. M. Co. Lawson C. M. Co. Milner, Christopher	2 2 1 2	Working.	<i>P. W. McNaughton</i>	Joggins.
5	New York & Acadia Co. . .	Scotia	4	.....	.....	Maccan.
51, 53	W. Patrick et al.	Patrick	1	.....	W. Patrick	Maccan.
1, 2, 3, 4	Salt Springs Coal Co. ....	.....	1	.....	J. L. Hewson	Oxford.
56	Minudie M. & T. Co. ....	.....	1	Working.	.....	River Hebert.
57	Styles Mining Co. (Ltd.) . .	.....	5	.....	J. S. Hickman ..	Amherst.
16	Victoria Coal Mining Co. . .	.....	2			
22, 23, 28, 29, 30	McNaughton, P. W. ....	.....	1			
9	Tupper, C. H. ....	.....	4			
58, 59, 60, 61	Cumberland R. R. & C. Co.	.....	1			
	Cowans & Cove .....	.....	4			
	Annand, Chas. ....	.....	1			
Area under lease			47 square miles.			

LIST OF COAL LEASES.—(Continued.)

No.	Lessee.	Colliery.	Area Sq. Miles.	Working.	Agent and Manager.	Postal Address.
1	Acadia Coal Co	PICTOU CO. Fraser Acadia Pictou Vale Albion	1	Working.	{ H. S. Poole. . . J. Macneil . . . T. Turnbull . . . J. Dunbar . . .	Stellarton. Westville. Vale Colliery. Albion Colliery.
3	"		1	Working.		
42	"		4	Working.		
23	"		3	Working.		
10	"		4	Working.		
11	Gray, B. G., et al.	Drummond	1		C. Fergie	Westville.
13, 14,	Haliburton, R. G., et al.		1			
12	Interecolonial Coal Co		2			
6	"		1	Working.		
24	Montreal & New Glasgow		1			
45	Richey, M. H.	East River	1		Muir & Sons . . .	New Glasgow.
46	B. G. Gray		2	Working.		
	N. Glasgow I. C. & R. R. Co.		1			
	Acadia Coal Co		1			
			24			
3	Archibald, Blowers.	CAPE BRETON CO. Gowrie " Blockhouse (sea area)	1	Working.	{ Archibald & Co. Chas. Archibald.	North Sydney. Cow Bay.
2	Archibald, Thomas D.		1			
5, 28,	C. Belloni.		2	Working.		
29	"		1		R. Belloni	Cow Bay.

MINES REPORT.

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15	Caledonia C. & R. Co. (<i>sea area</i>)..	Caledonia	1	Working.	David McKeen ..	Glace Bay.
31	"	1			
8, 9	Halifax Coal and Iron Co..	Ontario	1½	Working.	<i>Jno. Sutherland</i> .	Pt. Caledonia.
	General Mining Association.	Bridgeport....	2		{ Rich. H. Brown.	Sydney Mines.
27	" "	Sydney	18	Working.	{ Cunard & Morr'w	Halifax.
	" "	"	4		{ H. Mitchell....	Bridgeport.
38, 39	Low Point, Barasois, and..	Lingan	13	Working.	R. Robson	Low Point.
10, 21	Lingan Mining Co., (Ltd.)..	"	10			
	Gibson, John, et al.....	.....	2			
4, 12, 16	Glace Bay Mining Co.	Glace Bay	3	Working.	{ E. P. Archbold..	Halifax.
6, 13, 18, 19, 30	Internat'nal Coal Co., (Ltd.)	International ..	5	Working.	{ <i>Chas. Reigby</i>	Lt. Glace Bay.
66	Merchants' Bank of Canada.	Gardner	2		J. G. S. Hudson ..	Bridgeport.
52, 53	McLeod, Hugh .....	.....	2			
40, 41, 42	Ross, H. E., et al. ....	.....	3			
79	Ross, W. J., et al. (<i>sea area</i>).	.....	1			
32	Weatherbe & Hendry, " ..	.....	3			
23, 25, 70	Sydney & Louisburg Coal &	.....			
14, 24	R. R. Co., (Ltd.)	Schooner Pond .	} 10			
49	"	Reserve		Working.	D. J. Kennelly. ...	Sydney.
64, 65, 68	"	Lorway				
69	"	Emery				
54 to 63	Sydney C. M. Co. (<i>sea areas</i>)	.....	10			
67	Weatherbe & Kirby .....	.....	1			
78	Weatherbe, R. L. (<i>sea area</i>).	.....	5			
96, 97, 98, 99, 100	Low Point, Barasois and Lingan Mining Co., (Ltd.)	.....	5			
	" (<i>sea areas</i>)	.....	2			
	Roberts, Frank .....	.....	1			

LIST OF COAL LEASES.—*Continued.*

No.	Lessee.	Colliery.	Area Sq. Miles.	Working.	Agent and Manager.	Postal Address.
112, 113, 114 108, 109, 110	Hamilton, A. G. et al..... Cowans & Drummond..... Ross, W. and McLean, Jno.	..... ..... .....	1 5 3 <hr/> 119½			
7, 12 13 4 11 6 10	Inverness C. I. & R. C... McGregor, J. D..... Richey, M. H., et al..... Ross, W. J..... Ross, H. E., et al, (<i>sea area</i>). Tremaine, E. D., (<i>sea area</i>).	INVERNESS CO. Port Hood..... Broad Cove.....	2 3 1 1 1 1			
2 3, 4, 5	Kenny, T. E. Ross, Wm.	VICTORIA CO. N'w Campbell't'n Black Rock....	3 5 <hr/> 8			
	Terminal City Co.....	RICHMOND CO. Caribou Cove..	1			
Total area under lease.....			242½	square miles.		

TABLE A.—COAL TRADE BY COUNTIES.

	CUMBERLAND.		PICTOU.		CAPE BRETON.		OTHER COUNTIES.		TOTAL.	
	Raised.	Sold.	Raised.	Sold.	Raised.	Sold.	Raised.	Sold.	Raised.	Sold.
1st Quarter	108,986	97,656	100,679	74,853	103,466	8,857	.....	.....	313,131	181,366
2nd Quarter	110,464	92,656	88,779	79,083	230,225	202,947	.....	.....	429,468	374,686
3rd Quarter	119,213	100,970	123,039	113,875	315,581	356,591	.....	.....	557,833	571,436
4th Quarter	151,778	128,346	118,883	115,671	185,186	183,602	.....	.....	455,847	427,619
Total	490,441	419,628	431,380	383,482	834,458	751,997	.....	.....	1,756,279	1,555,107
1888	470,829	419,549	474,188	418,893	831,111	738,250	.....	.....	1,776,128	1,576,692
1887	499,472	465,148	389,906	339,034	786,360	715,442	100	60	1,670,838	1,519,684

TABLE B.—COAL TRADE BY COUNTIES.

	CUMBERLAND.			PICTOU.			CAPE BRETON.			TOTALS.			Grand Total.
	Round.	Slack.	Run of Mine.	Round.	Slack.	Run of Mine.	Round.	Slack.	Run of Mine.	Round.	Slack.	Run of Mine.	
Nova Scotia Land Sales	58,159	37,885	5,253	119,229	86,994	...	2,203	4,558	...	179,591	129,437	5,253	314,281
Sea Borne.....	997	241	...	34,024	7,461	..	157,666	23,312	12,443	192,687	31,014	12,443	236,144
Total	59,156	38,126	5,253	153,253	94,455	..	159,869	27,870	12,443	372,278	160,451	17,696	550,425
New Brunswick	88,261	22,871	18,364	28,825	3,587	..	32,570	520	176	149,656	26,978	18,540	195,174
Newfoundland ..	.....	...	.....	147	6	..	84,466	2,924	...	84,613	2,930	.....	87,543
P. E. Island ..	.....	...	.....	7,460	21,704	..	15,194	10,582	...	22,654	32,286	.....	54,940
Quebec	38,052	19,689	119,720	68,506	4,755	...	317,501	62,515	1,058	424,059	86,959	120,778	631,796
W. Indies .....	.....	...	.....	.....	.....	...	3,983	.....	..	3,983	.....	.....	3,983
United States ..	.....	9,946	190	132	652	...	5,333	13,733	..	5,465	24,331	190	29,986
Other Countries	.....	.....	.....	..	.....	...	1,260	.....	..	1,260	.....	..	1,260
Total	185,469	90,632	143,527	258,323	125,159	..	620,176	118,144	13,677	1,063,968	333,935	157,204	1,555,107

COAL—SALES.

NAMES.	1st Quarter.	2nd Quarter.	3rd Quarter.	4th Quarter.	Year 1889.	Year 1888.
Nova Scotia :						
Land Sales,	78,738	63,138	66,871	105,534	314,281	280,521
Sea Borne,	7,583	46,194	91,559	90,808	236,144	229,384
N. S.—Total,	86,321	109,332	158,430	196,342	550,425	509,905
N. Brunswick,	40,792	43,523	46,747	64,112	195,174	214,630
Newfoundl'd,	1,435	20,869	37,045	28,194	87,543	83,725
P. E. Island,	.....	17,796	20,989	16,155	54,940	56,349
Quebec,	52,643	177,892	294,172	107,089	631,796	678,321
West Indies,	.....	813	694	2,476	3,983	3,111
United States,	175	4,461	12,099	13,251	29,986	30,198
Oth'r countries	.....	.....	1,260	.....	1,260	453
Total.....	181,366	374,686	571,436	427,619	1,555,107	1,576,692
1888	168,708	386,482	601,519	419,983	1,576,692	.....
1887	138,814	376,174	551,643	443,053	1,519,684	.....

COAL.—GENERAL STATEMENT.

1889.	Produce.	Sold.	Colliery Consumption.
1st Quarter	313,131	181,366	38,797
2nd Quarter.....	429,468	374,686	40,521
3rd Quarter.....	557,833	571,436	35,054
4th Quarter.....	455,847	427,619	43,759
Total	1,756,279	1,555,107	158,131
1888	1,776,128	1,576,692	157,443
1887	1,670,838	1,519 684	139,777

MINES REPORT.

COAL PRODUCE OF NOVA SCOTIA DURING THE YEAR ENDED DECEMBER 31ST, 1889.

COLLIERIES.	SALES.					COLLIERY CONSUMPTION.	
	Produce.	Round.	Slack.	Run of Mine.	Total.	Engines.	Workmen.
CUMBERLAND Co.							
Chignecto	18,572	9,145	4,505	.....	13,650	4,327	385
Joggins	45,411	34,513	3,422	.....	37,935	6,512	877
Minudie	1,300	1,192	108	.....	1,300	.....	.....
Springhill	425,149	140,619	82,597	143,527	366,743	23,145	5,612
PICTOU Co.							
Acadia	269,607	151,363	78,535	.....	229,838	29,035	10,041
Barton .....	.....	.....	.....	.....	.....	.....	.....
Black Diamond	34,015	22,725	9,665	.....	32,390	907	332
East River	1,545	1,125	.....	.....	1,125	205	70
Intercolonial	125,957	82,914	36,959	.....	119,873	5,570	2,099
Holmes	256	256	.....	.....	256	.....	.....
CAPE BRETON.							
Bridgeport	21,496	23,343	879	.....	24,222	182	171
Caledonia	114,299	76,165	26,815	.....	102,980	1,190	1,311
Franklyn	4,046	3,424	980	.....	4,404	.....	.....
Glace Bay	80,920	71,627	2,292	.....	73,919	4,902	1,478
Gowrie	111,700	83,572	16,873	.....	100,445	4,550	4,480
International	123,915	87,738	30,348	.....	118,086	3,524	1,858
Ontario	2,866	2,684	10	.....	2,694	98	82
Reserve	121,649	90,453	19,772	.....	110,225	6,381	3,325
Sydney	144,966	112,230	11,672	.....	123,902	14,290	8,376
Victoria.....	108,601	68,940	8,503	13,577	91,120	9,186	3,630
Total.....	1,756,279	1,063,968	333,935	157,204	1,555,107	114,004	44,127

MINES REPORT.

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COLLIERY CONSTRUCTION ACCOUNT, 1889.

COLLIERIES.	Shafts.	Slopes.	Levels.	Machinery.	Colliery Buildings.	Dwell-ings.	Surface Works.	Railways.	Wharves.	Prospect-ing.	Total.
CUMBERLAND Co.											
Blight		\$1635 00	\$ 630 00	\$310 00	\$ 270 00	\$	\$ 207 00		\$		\$ 3052 00
Chignecto											5901 00
Joggins		1973 00	3928 00								4267 00
Springhill				1784 00	1577 00		906 00				928 00
Stanley		177 00		15 00	90 00	30 00				616 00	
PICOU Co.											
Acadia				7919 00	114 00						16317 00
Black Diamond		8284 00		2363 00						962 00	3325 00
East River											
Intercolonial				2011 00	54 00						2065 00
CAPE BRETON Co.											
Bridgeport						150 00					150 00
Caledonia			2000 00			657 00					2657 00
Franklyn											
Glace Bay				600 00		800 00					1400 00
Gowrie		598 00	2268 00								2866 00
International		319 00	173 00			1204 00					1696 00
Ontario			200 00		20 00						220 00
Reserve		4128 00	1266 00	37 00							5431 00
Sydney				1796 00					799 00		2595 00
Victoria		2288 00	4246 00								6534 00
Total		19402 00	\$14711 00	\$16835 00	\$2125 00	\$2841 00	\$1113 00		\$ 799 00	\$1578 00	\$59404 00

MINES REPORT.

Statement of the Number and Classes of Men employed, and average results at each Colliery, during the year ended December 31st, 1889.

COLLIERIES.	UNDERGROUND.				ABOVE GROUND.				CONSTRUCTION.				TOTAL.		Average num-ber of tons per cutter.	Average quan-tity raised per day.	HORSES.		PITS WORKED.
	Skilled Labor.	Lab'rs.	Boys.	Days.	Skilled Labor.	Lab'rs.	Boys.	Days.	Skilled Labor.	Lab'rs.	Boys.	Days.	Persons.	Days Labor.			Above.	Below.	
CUMBERLAND CO.																			
Chignecto.....	25	7	6	11241	5	11	6	6692	.....	.....	.....	.....	60	17933	743	62	2	3	296
Joggins.....	52	10	9	21022	4	33	1	9449	.....	.....	.....	.....	109	30471	873	156	3	7	290
Minudie.....	9	.....	.....	1135	1	1	3	1055	.....	.....	.....	362	16	2552	144	14	.....	.....	90
Springhill.....	436	181	141	191849	90	160	30	69650	3	5	.....	1929	1046	263428	975	1680	9	48	253
Stanley.....	2	.....	.....	62	2	.....	.....	160	.....	.....	.....	.....	4	222	.....	.....	3	.....	.....
PICOU CO.																			
Acadia.....	276	273	350	142704	90	114	39	75520	2	15	.....	5314	1160	223538	976	1225	18	18	220
Black Diamond..	18	18	7	10939	3	11	2	3799	.....	.....	.....	.....	59	14738	1889	159	1	3	214
East River.....	4	.....	.....	734	1	.....	.....	255	.....	.....	.....	.....	5	989	386	8	.....	.....	178
Intercolonial....	136	78	40	55788	27	56	10	29466	2	1	.....	600	350	85854	926	479	7	11	263
CAPE BRETON CO.																			
Bridgeport.....	22	2	3	8215	2	3	2	2517	.....	.....	.....	.....	34	10732	977	98	2	5	218
Caledonia.....	144	18	39	35892	18	34	11	19622	5	.....	.....	1538	269	57052	793	617	7	25	185
Franklyn.....	6	1	2	1863	.....	1	.....	255	.....	.....	.....	.....	10	2118	674	.....	.....	1	.....
Glace Bay.....	105	10	26	23675	35	42	5	20703	.....	.....	.....	.....	223	44378	770	439	5	21	184
Gowrie.....	132	21	48	37177	24	59	15	24328	.....	.....	.....	.....	299	61505	846	739	8	26	151
International....	127	25	42	19636	30	44	16	11196	.....	.....	.....	.....	284	30832	975	826	5	29	150?
Reserve.....	144	22	49	38025	43	42	14	20281	1	.....	.....	32	315	58338	844	500	4	23	243
Ontario.....	12	2	1	1096	3	4	.....	1300	.....	.....	.....	.....	27	2396	238	30	3	1	95
Sydney.....	234	55	113	90065	56	82	35	46449	6	4	1	2758	586	139272	619	674	9	51	215
Victoria.....	132	58	21	47634	11	78	16	28766	.....	.....	.....	.....	316	76400	822	432	5	7	251
Totals.....	2016	781	897	738752	445	775	205	371463	22	25	1	112533	5167	1122748	.....	.....	.....	.....	.....

COAL.

NOVA SCOTIA EXPORTED TO THE UNITED STATES.

Years.	Tons.	Duty.	Years.	Tons.	Duty.
1850	118,173	24 ad.	1870	168,180	\$1 25
1851	116,274	"	1871	165,431	" "
1852	87,542	"	1872	154,092	75
1853	120,764	"	1873	264,760	"
1854	139,125	Free.	1874	138,336	"
1855	103,222	"	1875	89,746	"
1856	126,152	"	1876	71,634	"
1857	123,335	"	1877	118,216	"
1858	186,743	"	1878	88,495	"
1859	122,720	"	1879	51,641	"
1860	149,289	"	1880	123,423	"
1861	204,457	"	1881	113,728	"
1862	192,612	"	1882	99,302	"
1863	282,775	"	1883	102,755	"
1864	347,594	"	1884	64,515	"
1865	465,194	"	1885	34,483	"
1866	404,252	"	1886	66,003	"
1867	338,492	\$1 25	1887	73,892	"
1868	228,132	"	1888	30,198	"
1869	257,485	"	1889	29,986	"

NOTE—The quantities given for the years 1852 to 1872 are on the authority of the Board of Trade, Philadelphia, and are probably under-estimated.

MINES REPORT.

Nova Scotia Coal Sales, from 1785 to 1889 (Inclusive.)

Year.	Sales.	Total.	Year.	Sales.	Total.
1785	1,668	14,349	1841	148,298	Forw'd 1,208,150
1786	2,000		1842	129,708	
1787	10,681		1843	105,161	
1788			1844	108,482	
1789			1845	150,674	
1790			1846	147,506	
1791	2,670	1847	201,650	1,533,798	
1792	2,143	1848	187,643		
1793	1,926	1849	174,592		
1794	4,405	1850	180,084		
1795	5,320	1851	153,499		
1796	5,249	1852	188,076		2,399,319
1797	6,039	1853	217,416		
1798	5,948	1854	234,812		
1799	8,947	1855	238,215		
1800	8,401	1856	253,492		
1801	5,775	1857	294,198	4,927,339	
1802	7,769	1858	226,725		
1803	6,601	1859	270,293		
1804	5,976	1860	322,593		
1805	10,130	1861	326,429		
1806	4,938	1862	395,637		
1807	5,119	1863	429,351	7,317,430	
1808	6,616	1864	576,935		
1809	8,919	1865	635,586		
1810	8,609	1866	558,520		
1811	8,516	1867	471,185		
1812	9,570	1868	453,624		
1813	9,744	1869	511,795	12,124,025	
1814	9,866	1870	568,277		
1815	9,336	1871	596,418		
1816	8,619	1872	785,914		
1817	9,284	1873	811,106		
1818	7,920	1874	749,127		
1819	8,692	1875	706,795	29,510,061	
1820	9,980	1876	634,207		
1821	11,388	1877	697,465		
1822	7,512	1878	693,511		
1823	27,000	1879	688,628		
1824		1880	954,659		
1825		1881	1,035,014		
1826	12,600	1882	1,250,179	Total.....	
1827	12,149	1883	1,297,523		
1828	20,967	1884	1,261,650		
1829	21,935	1885	1,254,510		
1830	27,269	1886	1,373,666		
1831	37,170	1887	1,519,684		
1832	50,369	1888	1,576,692	839,954	
1833	64,743	1889	1,555,107		
1834	50,813				
1835	56,434				
1836	107,593				
1837	118,942				
1838	106,730				
1839	145,962				
1840	101,198				

SUMMARY.

1785 to 1790.....	14,349	1831 to 1840	839,954
1791 to 1800.....	51,048	1841 to 1850	1,533,798
1801 to 1810.....	70,452	1851 to 1860	2,399,319
1811 to 1820.....	91,527	1861 to 1870	4,927,339
1821 to 1830.....	140,820	1871 to 1880	7,317,430

GOLD—GENERAL STATEMENT FOR THE YEAR 1889.

Showing the number of Mines, Days' labor performed, quantities of Quartz crushed, yield of Gold, for the year 1889.

DISTRICTS.	Number of Mines.	Days' Labor.	Mills.	Tons of Quartz crushed.	Yield of Gold per Ton.		Maxim. Yield of Gold per Ton.		Total Yield of Gold.	
					Oz.	Dwt. Gr.	Oz.	Dwt. Gr.	Oz.	Dwt. Gr.
Brookfield	1	4688	2	1472	1	4 9	1	19 13	1796	17 18
Caribou and Moose River	4	20819	5	7338	..	5 4	..	7 12	1906	1 10
Fifteen Mile Stream	1	3634	1	1416	..	11 2	..	14 6	786	9 0
Lake Catcha	1	10764	2	807	..	15 1	2	9 10	607	10 0
Malaga Barrens	2	28686	2	4388	..	18 2	1	5 13	3976	3 13
Montague	2	10286	3	953	1	19 21	26	11 20	1901	10 6
Oldham	1	8405	1	1391	1	18 22	5	11 18	2709	0 18
Rawdon	1	7192	2	925	2	10 23	3	18 19	2358	10 0
Renfrew	2	8141	2	1070	..	13 1	1	15 18	697	17 15
Salmon River	1	17393	1	7633	..	5 7	..	7 14	2032	14 0
Sherbrooke	2	5257	4	1618	..	3 0	..	2 21	243	17 17
Stormont	2	16319	1	2925	..	11 22	..	15 19	1745	6 0
Tangier and Mooseland	1	3168	2	427	..	5 6	..	15 9	112	4 12
Uniacke	2	13307	3	2296	..	12 2	4	15 0	1390	11 9
Whitburn	4	28593	2	1639	1	9 18	2	3 15	2440	15 18
Wine Harbor	1	2355	2	707	..	11 17	1	0 0	413	18 6
Unproclaimed, etc.	5	22541	15	2155	..	9 14	..	19 14	1035	18 15
Total	33	211548	50	39160	..	17 22	..	.. ..	26155	6 13

MINES REPORT.

MONTHLY STATEMENT FROM EACH GOLD DISTRICT.

MONTH.	BROOKFIELD.						CARIBOU AND MOOSE RIVER.							
	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Yield of Gold.			No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Yield of Gold.		
					Oz.	Dwt.	Grs.					Oz.	Dwt.	Grs.
January .....	..	....	..	105	184	..	16	5	2406	96	683	218	4	10
February .....	..	....	..	109	215	11	2	5	2125	85	561	202	8	13
March .....	..	....	..	220	303	..	..	5	2129	85	586	219	17	15
April	1	710	28	176	251	..	..	3	1578	63	616	188	10	18
May	1	570	22	111	139	..	..	4	1636	65	677	180	5	..
June	1	497	20	99	125	..	..	5	1680	67	657	152	17	..
July .....	..	....	..	101	125	..	..	3	1430	57	508	97	2	12
August .....	..	....	..	130	131	16	..	3	1465	58	668	109	19	..
September .....	..	....	..	176	159	10	..	4	1362	54	413	49	3	12
October	1	1082	43	105	74	..	..	5	1498	60	639	94	11	9
November	1	943	37	140	89	..	..	4	1776	71	754	174	7	5
December	1	886	35	....	..	..	..	4	1734	69	576	218	14	12
Total	1	4688	....	1472	1796	17 18	18	4	20819	....	7338	1906	1	10

MONTHLY STATEMENT FROM EACH GOLD DISTRICT.—Continued.

MONTH.	FIFTEEN MILE STREAM.						LAKE CATCHA.					
	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Yield of Gold.		No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Yield of Gold.	
					Oz.	Dwt.					Oz.	Dwt.
January	1	466	18	96	..	..	1	1155	46	138	89	1
February	1	518	20	110	..	..	1	802	32	99	44	..
March	1	717	28	160	47	15	2	1117	44	96	32	2
April	1	519	20	108	43	10	1	449	18	..	..	..
May	1	676	27	152	50	..	1	708	28	35	68	12
June	1	738	29	167	88	..	1	866	34	27	31	12
July	1	..	..	..	78	2	2	1025	41	..	..	..
August	1	..	..	..	77	11	2	999	40	94	16	12
September	1	..	..	..	130	15	1	977	39	..	..	..
October .....	..	..	..	225	150	10	1	1025	41	199	67	9
November .....	..	..	..	215	120	6	1	735	29	67	165	12
December .....	..	..	..	..	..	..	1	906	36	52	92	10
Totals	1	3634	..	1416	786	9	1	10764	..	807	607	10

MONTHLY STATEMENT FROM EACH GOLD DISTRICT.—Continued.

MONTH.	MALAGA BARRENS.						MONTAGUE.					
	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Yield of Gold.		No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Yield of Gold.	
					Oz.	Dwt.					Oz.	Dwt.
January	2	3087	123	447	373	18	1	526	21	25	30	10
February	2	2031	81	395	171	15	2	482	19	52	74	8
March	1	1684	67	343	303	17	2	652	26	46	66	10
April	2	1974	79	378	332	8	3	618	24	70	171	5
May	2	1965	78	376	311	..	2	297	12	6	159	11
June	2	1965	78	301	326	9	1	452	18	82	91	14
July	2	2239	89	340	390	8	2	755	30	89	99	16
August	2	2760	110	338	431	18	2	1189	47	80	71	1
September	2	2630	105	505	540	17	3	983	39	30	173	8
October	2	2831	113	146	52	8	3	1180	47	116	365	5
November	2	2715	108	396	352	8	3	1544	62	152	365	9
December	2	2805	112	423	388	16	3	1608	64	205	232	13
Totals	2	28686	..	4388	3976	3	2	10286	..	953	1901	10
						13						6

MINES REPORT.

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MONTHLY STATEMENT FROM EACH GOLD DISTRICT.—Continued.

MONTH.	OLDHAM.							RAWDON.						
	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Yield of Gold.			No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Yield of Gold.		
					Oz.	Dwt.	Grs.					Oz.	Dwt.	Grs.
January	2	1384	55	175	149	2	18	..	25	1	60	139	..	..
February	2	1225	49	149	134	18	6	..	30	1	90	179	..	..
March	2	1134	45	139	302	4	0	..	30	1	100	211	..	..
April .....	..	.....	.....	144	804	14	12	..	40	2	120	255	..	..
May .....	..	72	3	132	503	7	10	..	30	1	120	350	..	..
June.....	..	43	2	103	35	8	0	..	40	2	120	394	..	..
July	1	580	23	132	69	0	0	1	1505	60	100	352	..	..
August.....	1	727	29	94	173	3	18	1	1495	59	100	189	10	..
September	1	681	27	115	114	12	2	1	1299	52	85	218	..	..
October.....	1	834	33	.....	..	..	..	1	1214	48	100	71	..	..
November	1	884	35	117	148	3	0	1	759	30	50	..	..	..
December	2	841	33	91	274	7	0	1	725	29	.....	...	..	..
Total	1	8405	..	1391	2709	0	18	1	7192	...	925	2358	10	0

MONTHLY STATEMENT FROM EACH GOLD DISTRICT.—Continued.

MONTH.	RENTREV.						SALMON RIVER.							
	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Yield of Gold.			No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Yield of Gold.		
					Oz.	Dwt.	Grs.					Oz.	Dwt.	Grs.
January	2	666	26	....	....	..	..	1	1404	56	210	66	..	..
February	2	790	31	....	....	..	..	1	1387	55	620	255	..	..
March	2	886	35	....	....	..	..	1	1461	58	674	159	..	..
April	3	1366	54	336	179	7	14	1	1365	54	520	198	..	..
May	2	622	25	237	241	..	1	1	1350	54	650	252	..	..
June	2	800	32	205	116	5	..	1	1309	52	550	160	10	..
July	2	861	34	20	35	15	..	1	1308	52	800	157	..	..
August	2	740	29	....	....	..	..	1	1619	64	800	219	..	..
September	2	553	22	....	....	..	..	1	1258	50	659	156	14	..
October	1	307	12	150	91	10	..	1	1741	69	600	103	..	..
November	1	325	13	110	23	..	..	1	1595	64	800	149	10	..
December	1	225	9	12	11	..	..	1	1596	64	750	157	..	..
Totals.....	2	8141	....	1070	697	17	15	1	17393	....	7633	2032	14	..

MINES REPORT.

D

MONTHLY STATEMENT FROM EACH GOLD DISTRICT.—Continued.

MONTH.	SHERBROOKE.							STORMONT.						
	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Yield of Gold.			Days' Labor.	No. of Men.	Tons Crushed.	Yield of Gold.			
					Oz.	Dwt.	Gr.				Oz.	Dwt.	Gr.	
January ..	2	586	23	276	45	8	12	1524	61	236	139	10	..	
February ..	1	240	9	0	0	0	0	1324	53	255	143	10	..	
March....	1	260	10	280	46	9	0	1219	48	274	170	10	..	
April	1	600	24	36	5	8	0	1346	54	247	175	10	..	
May.....	1	113	5	200	29	1	0	1416	56	280	148	5	..	
June	1	140	5	221	32	9	0	1430	57	238	188	2	..	
July	2	130	5	0	0	0	0	1434	57	269	162	0	..	
August	2	401	16	0	0	0	0	1169	46	191	94	6	..	
September	1	804	32	0	0	0	0	1411	56	244	137	16	..	
October	3	690	27	390	59	19	0	1282	51	227	148	6	..	
November ..	3	460	18	110	17	13	5	1311	52	272	138	6	..	
December ..	2	833	33	105	10	10	0	1453	58	192	100	6	..	
Total	2	5257	..	1618	243	17	17	16319	...	2925	1745	6	..	

MINES REPORT.

MONTHLY STATEMENT FROM EACH GOLD DISTRICT.—Continued.

MONTH.	TANGIER AND MOOSELAND.					UNIACKE.							
	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Yield of Gold.		No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Yield of Gold.		
					Oz.	Dwt.					Oz.	Dwt.	Grs.
January .....	..	251	10	..	..	..	2	1025	41	23	92	15	..
February .....	..	199	8	..	..	..	2	949	38	398	105	15	20
March.....	1	265	10	35	12	10	2	1154	46	149	122	9	15
April .....	..	92	3	14	3	2	2	1058	42	130	121	8	..
May	1	427	17	35	14	3	2	1376	55	112	97	11	15
June.....	2	269	10	20	15	7	2	1401	56	80	86	10	..
July	1	234	9	76	9	5	2	1036	41	160	112	12	..
August.....	..	321	13	6	..	15	2	1066	42	230	185	12	..
September	1	189	7	73	18	10	2	1016	40	268	106	4	10
October	1	412	16	50	14	11	2	1081	43	255	151	11	2
November	1	249	10	65	13	6	2	1071	43	261	132	13	15
December	1	260	10	53	10	13	2	1074	43	230	75	8	4
Totals	1	3168	....	427	112	4	2	13307	....	2296	1390	11	9

MONTHLY STATEMENT FROM EACH GOLD DISTRICT.—Continued.

MONTH.	WHITEBURN.						WINE HARBOR.					
	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Yield of Gold.		No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Yield of Gold.	
					Oz.	Dwt.					Oz.	Dwt.
January	4	2581	103	98	125	16	1	121	5	..	..	..
February	4	2495	99	53	105	10	..	68	2	64	49	9
March	4	2248	89	72	157	3	..	39	2	92	59	7
April	3	2385	95	135	255	6	1	537	21	40	7	15
May	3	2744	109	161	252	9	1	245	10	3	3	..
June	3	2727	109	147	193	14	1	372	15	..	..	..
July	3	1897	76	180	241	9	2	367	14	176	146	10
August	4	2732	109	147	236	1	1	250	10	131	58	18
September	4	3110	124	139	205	7	1	315	12	..	..	..
October	4	2243	89	181	221	9	..	4	..	..	..	..
November	4	2197	87	183	347	17	..	8	..	113	43	14
December	4	1234	49	143	98	9	..	29	..	88	45	5
Totals	4	28593	..	1639	2440	15	1	2355	..	707	413	18
						18					6	6

MONTHLY STATEMENT FROM EACH GOLD DISTRICT.—Continued.

MONTH.	UNPROCLAIMED DISTRICTS, &c.					
	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Yield of Gold.	
					Oz.	Dwts. Grs.
January	5	2227	89	83	76	7 12
February.....	4	2787	111	81	68	4 10
March	5	3399	136	169	165	10 4
April	3	1338	53	463	97	4 12
May.....	7	1516	60	118	82	8 13
June.	8	2521	100	267	149	5 8
July.....	5	856	34	419	137	8 5
August.....	5	1691	67	98	62	18 16
September	3	696	27	142	79	3 8
October	8	2552	102	129	36	3 12
November	7	1700	68	97	33	8
December	6	1258	50	89	47	
Total.....	5	22541	.....	2155	1035	18 15

MINES REPORT.

Y

GOLD.

GENERAL ANNUAL SUMMARY.

YEAR.	Total ounces of Gold extracted.			Stuff Crushed.	Yield per ton of 2000 lbs.			Total Days' Labor.	Average earnings per man per day and year, at 300 working days, \$18 per oz.	
	Oz.	Dwt.	Grs.		Oz.	Dwt.	Grs.		A Day.	A Year.
1862	7275	0	0	6473	1	2	11	156,000	\$0 83	\$249
1863	14001	14	17	17002		16	11	273,264	92	276
1864	20022	18	13	21434		18	16	252,720	1 42	426
1865	25454	4	8	24423	1	0	20	212,966	2 15	645
1866	25204	13	2	32162		15	2	211,796	2 14	642
1867	27314	11	11	31386		17	9	218,894	2 24	672
1868	20541	6	10	32262		12	17	241,462	1 53	459
1869	17868	0	19	35147		10	4	210,938	1 52	456
1870	19866	5	5	30829		12	21	173,680	2 05	615
1871	19227	7	4	30791		12	11	162,992	2 12	636
1872	13094	17	6	17093		15	7	112,476	2 09	627
1873	11852	7	19	17708		13	9	93,570	2 28	684
1874	9140	13	9	13844		13	5	77,246	2 12	636
1875	11208	14	19	14810		15	4	91,698	2 20	660
1876	12038	13	18	15490		15	13	111,304	1 94	582
1877	16882	6	1	17369		19	10	123,565	2 46	738
1878	12577	1	22	17990		13	23	110,422	2 05	615
1879	13801	8	10	15936		17	8	92,002	2 34	702
1880	13234	0	4	14037		18	20	103,826	2 18	654
1881	10756	13	2	15556		12	20	126,308	1 52	456
1882	14107	3	20	22081		12	18	106,884	2 37	711
1883	15446	9	23	25954		10	21	97,733	2 84	862
1884	16059	18	17	25147		12	18	118,087	2 40	720
1885	22203	12	20	28890		15	4	157,421	2 53	759
1886	23362	5	13	29010		16	2	128,880	3 25	975
1887	21211	17	18	22280		19	11	173,448	2 20	660
1888	22407	3	10	36178		15	21	163,772	2 46	738
1889	26155	6	13	39160		17	22	211,548	2 22	666
Total	482316	16	21	650442	.....			4,314,902	.....	.....

INTERCOLONIAL RAILWAY.

STATEMENT showing number of tons of Coal received at the following Stations from Mines in Nova Scotia for year ended 31st December, 1889.

Stations.	No. of Tons.	Stations.	No. of Tons.
Halifax	43120.25	Moncton	16695.25
Dartmouth	7384.00	Salisbury	1007.50
Rocky Lake	438.25	Petitcodiac	111.00
Windsor Junction ..	5979.00	Penobsquis	1330.50
Wellington	89.75	Sussex	267.25
Enfield	557.75	Apohaqui	6.00
Elmsdale	146.50	Norton	166.00
Milford	65.75	Bloomfield	6.00
Shubenacadie	370.50	Hampton	549.50
Stewiacke	500.00	Rothsay	155.50
Brookfield	100.50	Cold Brook	6320.75
Truro	8439.50	Saint John	42214.00
Valley	11.00	Weldford ..	24.00
Riversdale	6.00	Kent Junction	3.94
West River	18.00	Chatham Junction..	499.00
Glengarry	12.00	Derby	23.00
Hopewell	1459.50	Newcastle	86.00
Stellarton	6042.00	Gloucester Junction	471.50
New Glasgow	20806.25	Bathurst	18.00
Pictou Landing	72464.00	Millerton	36.00
Pictou	7409.50	Jacquet River	12.00
Belmont	88.75	New Mills	18.00
DeBert	21.00	Charlo ...	18.00
East Mines	18.50	Eel River	6.00
Londonderry	75187.25	Dalhousie	66.50
Folleigh .....	.50	Campbleton	111.50
Wentworth	54.00	Metapedia	755.50
Westchester	18.00	Causapscat	6.00
Greenville	24.00	Cedar Hall	6.00
Oxford Junction	1167.50	St. Octave	12.00
River Philip	6.00	Ste. Flavie	12.00
Salt Springs	10.00	Rimouski	12.00
Athol	32.00	Trois Pistoles ..	52.00
Maccan	6.00	St. Eloie	6.00
Nappan	30.00	Riviere du Loup....	2298.50
Amherst	6691.00	St. Roche	14.00
Aulac	1969.50	St. Charles Junction	11.50
Sackville	3355.00	St. Henri Junction..	20065.50
Dorchester	3135.50	Chaudiere Junction..	83273.00
Memramcook	126.00	Point Levis	11028.50
Painsec Junction	6.00	Eastern Extension..	2377.25
Shediac	436.00	West of Chaudiere..	43040.50
Point du Chene	16.00	Total	501201.50

MINES REPORT.

AA

STATIONS FROM.

STATIONS.	No. Tons.
Stellarton	17215525
Westville	2337950
New Glasgow	3997675
Spring Hill	22808500
Maccan	3760500
Total	50120150

Moncton, N. B., February 4th, 1890.

INTERCOLONIAL RAILWAY.
Statement showing the Quantities in Tons of the different kinds of Coal received from the various Mines, for the use of the Intercolonial Railway during the year 1889.

MONTH.	SPRING HILL.			ACADIA				DRUM-MOND.	BLACK DIAMOND.	JOGGINS.	CHIGNECTO.
	Round.	Run of Mine.	Slack.	Round.	Run of Mine.	Nut.	Slack.	Coke.	Round.	Round.	Round.
January	12010	543	.....	6196	21	.....	101	12	3567	1804	1975
February	2842	17	.....	1348	.....	.....	31	.....	739	1881	3182
March	8104	37	.....	2475	21	.....	102	.....	.....	2226	1937
April	5987	28	.....	2283	.....	.....	84	.....	.....	2156	296
May	9764	.....	.....	2474	.....	.....	15	12	.....	1856	216
June	7620	.....	.....	1348	.....	.....	11	.....	.....	1340	457
July	6087	.....	.....	1956	16	22	.....	12	297	1041	.....
August	10370	.....	14	4239	.....	26	159	.....	1574	1561	100
September	6791	.....	.....	2955	.....	.....	69	13	1056	1493	20
October	9512	.....	.....	3554	.....	.....	62	.....	1787	1603	345
November	10619	.....	14	3034	.....	.....	112	.....	2892	1584	.....
December	10688	.....	.....	3047	.....	.....	117	.....	2279	1896	.....
Totals	190394	625	28	34909	58	48	863	49	14191	20441	8428
											100

The quantity of Coal carried from the Mines in Nova Scotia to the Upper Provinces was not quite as large as last year, as will be seen by the following comparative statement for the year which ended 31st December :—

	Tons.	Tons.
Moncton, N. B.,	1879	1884
Feb. 4, 1890.	1880	1885
	1881	1886
	1882	1887
	1883	1888
	570	570
	10,246	10,246
	30,629	30,629
	35,089	35,089
	54,891	54,891
	112,898	112,898
	165,791	165,791
	175,512	175,512
	192,022	192,022
	173,732	173,732

MINERALS OTHER THAN THOSE LEASED FROM THE CROWN.

GYPSUM.

	Tons.	
†Baddeck and outports	1,490	\$ 1,450
†Windsor	133,323	123,323
†Cheverie	18,800	14,486
†Walton	3,235	2,953
†Halifax	496	1,738
	147,344	\$143,950

MANGANESE.

	Tons.	
†*Windsor	36	\$2,178
†Loch Lomond	31	

ANTIMONY.

	Tons.	Value.
†Rawdon	30	\$695

MOULDING SAND.

	Tons.	
†Windsor	170	\$680

COPPER ORE.

	Tons.
Coxheath Mines	500

BUILDING STONE.

	Tons.	Value.
†Wallace	3,721	\$ 35,117.00
†Pugwash	180	720.00
do.	1,000	
†Hawkesbury		79.00

MANUFACTURED GRINDSTONES.

	Value.
†Amherst	\$ 7,128.00

† Amount exported.

* Amount mined, 81 tons ; average 5 men and 2 boys employed.

MINES REPORT.

LIMESTONE.			Value.
*Pugwash	Tons,	50	
Chester	"	200	
Bras d'Or Lime Company, } Marble Mountain, C. B. }	"	5,900	
Other Cape Breton quarries.....	"	5,000	
Brookfield	Barrels,	17,363	
*Arichat.....	"	10,576	\$10,576.00

IRON MINING.

Londonderry	Tons,	41,619
Bridgeville, Pictou Co.	"	†3,156
Brookfield, Colchester Co.....	"	1,732
Newton Mills, Colchester Co.	"	400
		45,907

AVERAGE FORCE EMPLOYED DAILY—LONDONDERRY.

On Mining.

	Men.	Days' Work.
Skilled labor, underground	62	16,847
" " above ground.....	13	3,993
Unskilled labor, "	29	7,502
" " underground	57	15,266

Limestone Quarry, Brookfield.

Skilled workmen	3	775
Unskilled workmen	24	4,561

Estimated number of men employed on an average in iron mining, Pictou County and elsewhere, 25.

The Mining and Mineral Statistics of Canada for the year 1888 show the following figures :

Building Stone.....	42,059 c. yds.	Value, \$120,245
Lime	29 450 bus.	" 6,480
Brick	7,060,000	" 46,695
Tiles	30,000	" 2,070

* Amount exported.

† Londonderry took 156 tons of Bridgeville ore.

REPORT
OF THE
DEPARTMENT OF MINES,
NOVA SCOTIA,
FOR THE YEAR 1891.



HALIFAX, N. S.:
COMMISSIONER OF PUBLIC WORKS AND MINES, QUEEN'S PRINTER.
1892.

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DEPARTMENT OF MINES.

REPORT FOR THE YEAR 1891.

*To His Honor MALACHY BOWES DALY, Esquire, Lieutenant-Governor
of Nova Scotia, &c., &c.*

MAY IT PLEASE YOUR HONOR,—

I respectfully present herewith to Your Honor the Annual Report of the Inspector of Mines, containing an account of the progress of mining operations, together with statistical information compiled by him from official and other returns.

I remain,

Your Honor's obedient servant,

CHARLES E. CHURCH,

Commissioner of Public Works and Mines.

HALIFAX, *March 3rd, 1892.*

REPORT

ON THE

MINES OF NOVA SCOTIA,

BY EDWARD GILPIN, Jr., A. M., F. G. S.,

Fellow of the Royal Society of Canada, Member of Canadian
Society of Civil Engineers, etc.

OFFICE OF INSPECTOR OF MINES,
HALIFAX, *March 1st, 1892.*

TO THE HONORABLE

CHARLES E. CHURCH, M. P. P., M. E. C.,
Commissioner of Public Works and Mines :

SIR,—I beg leave to submit the following report on the Mines of
Nova Scotia, for the year ending December 31st, 1891.

The following summary shows, so far as I have been able to learn,
the mineral production of Nova Scotia during the year 1891, compared
with that of the previous year :—

		1890.	1891.
Gold	Ounces..	24,358	23,391
Iron Ore.....	Tons....	55,191	57,311
Manganese Ore	"	266	41
*Coal raised	"	1,984,001	2,044,784
*Coke made	"	36,738	34,148
†Gypsum	"	146,003	161,934
‡Grindstones, etc.....	"	8,385	19,800
†Moulding Sand	"	170	230
†Antimony Ore.....	"	26	10
Limestone	"	35,000	18,000
Copper Ore	"	1,000	900

Through the kindness of the Collectors of Customs at the various
ports of the Province, I am enabled to give further details under this
head at the end of the report.

* Ton of 2240 lbs.

† Amount exported.

‡ Value in dollars.

I also give as an appendix a summary of the amount of minerals produced not paying royalty.

I beg leave also to submit the reports of W. Madden, Jr., Esq., Deputy Inspector for the County of Cumberland, and of P. Neville, Esq., Deputy Inspector for the Island of Cape Breton. These gentlemen have repeatedly visited the Coal mines in their respective districts, and have as usual rendered valuable assistance to the department. Mr. Maddin, in addition, visited a number of the Gold mines during the summer and fall.

COAL TRADE.

The returns show a sale during the past year of 1,849,945 tons against 1,786,111 tons during the preceding year. The increase was not as large as anticipated in the spring, and the explosion at the Spring Hill collieries, reported on in the report for the year 1890, reduced the output of Cumberland County by about 30,000 tons.

As compared with the sales of the year 1890 the most noticeable points are:—

The home sales were 639,737 tons compared with 601,956 tons in 1890.

The Province of Quebec took 775,286 tons against 751,931 tons in 1890.

The sales to the United States were 2585 tons of round, 58 tons of run of mine, and 22,788 tons of slack coal, in all 25,431 tons, as compared with 50,854 tons in 1890.

The sales to Newfoundland, New Brunswick, Prince Edward Island and other points show little difference.

CUMBERLAND COUNTY.

The sales of the county were 462,267 tons against 438,608 tons in 1890.

The production of the collieries of the Cumberland Railway and Coal Company was 459,395 against 419,012 tons in 1890, in spite of the delay caused by the explosion. Since that date the enlargement and completion of the air-way has been finished. New pumps, screens, etc., have been put in, and the colliery generally placed in excellent order. Safety lamps alone are used underground and no explosives.

The Chignecto mine has remained closed, and no returns of a satisfactory character have been received of the results of the prospecting carried on for other seams.

A little work has been done on the Maccan River collieries by Mr. Smith and others. Mr. Sharp of Amherst, and others, have traced the Styles seams further to the east, and added materially to our knowledge of this part of the district.

At the Joggins mines the system of long wall has been continued, and improvements made to the railway and wharf. The output was 60,056 tons.

PICTOU COUNTY.

The sales were 405,096 tons as compared with 430,509 tons in 1890.

The home sales were 265,098 against 277,753 tons in 1890.

The Province of Quebec took 63,219 tons compared with 90,461 tons in 1890.

The output of the Acadia Company was 286,372 tons, and of the Intercolonial Company 140,728 tons. The Black Diamond Colliery was purchased by the Acadia Company, which will continue the extraction of the pillars, etc.

At the Albion Colliery the work of re-opening the Ford Pit has been continued with success.

I submit herewith the report of Mr. Madden on the Collieries of Pictou and Cumberland Counties, during the past year:—

WESTVILLE, N. S.,

31st December, 1891.

E. GILPIN, ESQ.,

Inspector of Mines, &c., &c.

DEAR SIR,—I beg leave to send you herewith a condensed statement of my official work as Deputy Inspector of Mines for the Districts of Pictou, Colchester and Cumberland, for the year ending 31st December, A. D. 1891, including also a report on some of the Gold mines of the Province I have visited officially during the same period.

INTERCOLONIAL COAL MINING COMPANY, WESTVILLE.

The principal work in this mine during the past year has been extracting the pillars on the 3000 feet lift; on the north side the pillars have been very satisfactorily drawn, and all the plant from that side taken to the south side. A large proportion of the work done was in the S. Holmes area, in which they are successfully mining a large per centage of coals. There are yet, however, on their own area, a block of coal, 450' × 1800', standing with (4) four back-balances driven up to mine bord on next lift. A tail-rope running with 22 boxes on each trip is used on this level, and has proved an economical feature in underground haulage, and from the success

obtained in its use I would wish to draw to it special attention, as with it in this district one boy can alone do the work that hitherto (8) eight horses and as many drivers were required to do, which success, I trust, will induce others to follow the example. From this level a tunnel has been turned off to strike the Scott pit seam ; the tunnel it is computed, will require to be driven a distance of (600) six hundred feet, and to strike the seam down a distance of about 3000 feet from the surface. As the Scott pit seam improves in quality to the dip, it is believed that at this point the coal will be of extra good quality. On the lift below this the levels have been driven in on each side a distance of about (600) six hundred feet, and they intend driving them until the line is reached on each side, before extracting the coal, any further than to put up balances for returns, and then bring back the pillars on the fresh timber. There is sufficient coal on the 3000 feet lift to keep the mine working until the levels in the lower lift are in to the line. The Scott pit is now idle, and will remain so until the next season's shipping begins. The management intend to commence sinking another lift of (600) six hundred feet. The new winding engine, of which I made mention in last year's report, hoists (11) eleven boxes each trip.

Considerable expenses have been incurred this year in building the most important of which was a new brick engine house for the hoisting engine, also a new car shop ; and the bank house being too small, was enlarged.

ACADIA MINE, WESTVILLE.

In last year's report I made mention of the difficulties they had to contend with in this mine, viz., fire damp and bad roof. I regret to say that in this respect during this year the difficulty has not lessened, but increased. This mine has a perpendicular depth of about 1500, feet, and as the coal is tender and contains a large percentage of gas, the enormous pressure causes the gas to evolve from roof, pavement and sides, and the mine being as well very dusty, it is therefore difficult to manage. In October, two workmen, viz., W. A. Sutherland and David McKay, were appointed by the workmen to examine the mine. I accompanied them, and according to their report they were not satisfied with the condition of the mine, and made some suggestions in which I could not agree, and did not consider practicable, and at my request you (E. Gilpin, Esq., Inspector of Mines,) in company with James Maxwell, manager, and myself, travelled this mine and carefully inspected the same, and were satisfied that everything that could be done was done for the safety of the workmen and the property. No explosives are used in the working of this mine, and the only lights used are the Marsant and Menseller lamps. The successful management of this mine certainly requires strict discipline, and it is to be hoped that the employees will cheerfully obey the orders of the management for the safety of themselves and property. I know that at one time during the year some of the workmen employed in this mine were very uneasy, and probably are so yet ; if so, I can assure them that all is done for the preservation of life and property. During my (9) nine years' connection with this mine I have always

found the discipline good, and trust it will continue. All the workmen are now in the 3560 feet lift, as the 3100 feet lift is finished; the pressure was so great on this lift that some little coal was lost in the finishing up, being the first coal lost in this mine in my time; the air returns were damaged some, but are pretty well opened up now. The new hoisting engine is giving good satisfaction, also the new pump. It is difficult to describe the difficulties met with in a mine of this description, and only the men who work in it, and the management who anxiously conduct it, can fully estimate or realize the trouble and cost of keeping airways open, and the mine in good order and safety.

VALE COLLIERY, THORBURN.

Six Foot Seam.—In my last report I spoke of the introduction of the long-wall system. This has been carried on during the year in the lower lift 2000 feet down, but is not meeting with the desired success; the roof is of a very strong nature, and the slips run into the coal face, giving considerable trouble, making it expensive to keep the working faces open. On the 1000 feet lift during the year, pillar work principally has been carried on with very good results. Some very heavy feeders of water have been struck in this mine, entailing considerable loss and expense, as the pumps were of insufficient capacity to keep the water out; they were obliged to flood the lower mine bord, causing them to carry the air for hundreds of feet with brattice, and the bottom being of a soft nature, caused falls in the mine bord, which had to be cleaved and timbered. The management were obliged to place two new Knowles pumps in the mine; these pumps throw about 560 gallons per minute. The mine was partly idle for 7 or 8 weeks until the pumps were started, reducing the output of coal considerably. The following buildings, viz., the locomotive shop, carpenter's shops, office, stables, store house and boiler house, were moved from the McBean slope and put up at this mine, and caused considerable expense in so doing. Culm is used in firing the boilers instead of coal. Now that everything is placed and the mine in good order, I would not be surprised to hear of a larger output of coal next year.

McBean Seam, Thorburn.—No attempt has been made to open up this mine during the past year.

MCGREGOR PIT, STELLARTON.

At my official visitation of this mine, on 24th April, I found the pillar work spoken of in last year's report stopped, and masons busily employed building them off, the temperature kept continually rising, and as it was beginning to get alarmingly high, the management, after careful survey, decided it was all but on fire, and therefore determined to close up this portion of the mine with brick, stone, sand, &c. Through the past summer the North and South slants have been connected at the bottom, and as in consequence the north engine can hoist all the coal, the south engine is idle, and in future can be used for sinking purposes. Two new back-balances have been started off during the year, but as there is now a very large area of this mine resting on pillars, it is not desirable to make very rapid

progress until the overlying seams are dealt with, but as these seams are now being developed, it is only a matter of time until the pillars can be safely drawn. The depth of the mine is now about 2670' down, angle of descent from 16° to 25°.

FOORD PIT.

It has been found necessary in the development of this mine to build some very extensive brick arches, the roof having been broken to such a height it was supposed the air was getting into the old workings. The stone arches around the bottom of the shaft were very much wrecked by the fire, and there is now some 500 feet of brick arch about the bottom, all well filled and packed at the back with sand, thus making them air-tight, and giving a soft rest to the pressure. The bottom now looks very well. Quite a number of other large brick stoppings have been built. Two slants have been sunk to the dip, a distance of about 400 feet, and still sinking. Soon they will be mining the coal from the deep.

The coal cutting machine did not prove as satisfactory as anticipated, the lower part of the seam having some very hard boulders, it was not quite able to cope with them; some changes are now being made in the machine to meet this difficulty. The pit-head gear has been renewed and the latest improved screens and tipples fitted up, and everything around the pit-head is new. Fifty new coke ovens have been built, and a tunnel driven to conduct the gas from the ovens to the boilers, to utilize the gas for raising steam in lieu of coal, which must undoubtedly result in great economy of labor and coal.

On one side of the mine the temperature is about 80°, and necessitates a considerable quantity of air to keep it cool enough for the men to work, and as they proceed to the dip the gas makes freely, and unless greater power be used, there is no means of increasing the volume of air, and as it is necessary to obtain increased airway, the English slopes that were sunk 1700 or 1800 feet have been started sinking again, and a place turned off the north level of the Foord pit to cross-cut the measures and meet the slants, thus as there are two slants when completed, will make a good travelling-way and air-way, and give a good field of coal, giving the Foord pit two more seams, viz., the Cage pit and four feet seam immediately overlying it, all down-hill for the coal excepting through the tunnel, which will be about 300 or 400 feet, and as the water now finds its way to the Foord pit, they will not experience much difficulty from that source. There has been some five or six places driven into the old works, which would seem to indicate some errors in the old plans; these places had to be built off with iron rails and brick and sand; they have had many difficulties to contend with, but so far every difficulty has been met, and this mine is again assuming its usual appearance.

Third Seam Slopes.—It is understood that the Cage pit and Third Seam are connected by a tunnel some 250 feet in length, and the extension of this tunnel has cut another 4' feet seam of the best coal probably in this county, and a band of iron stone which carries 45 per cent. of iron. It takes time to advance levels and get new works like

this opened out, but I am pleased to say that this has been systematically and quickly done. During the year there was a back-balance driven up on the north side of Third seam, and nine bords turned away, and the levels extended a considerable distance beyond.

On the south side there has been a balance with 8 bords worked out nearly, and the levels extended. In the Cage pit seam the levels on north and south side have been rapidly extended and balances driven up.

In the Four Feet Seam the levels are also being extended and places driven up hill. Some of the iron has been taken out and roasted at the mine with satisfactory results. This seam of coal will be worked long wall.

SPRING HILL MINES.

It is unnecessary for me to say anything at length in reference to the explosion which occurred here on the 21st of last February, the investigation having been published in last year's report. I may, however, say there was a large staff of officials employed at this mine, all men of considerable practical experience, some of them extending over a period of thirty years. I was familiar with all of them, and had many private and public interviews with them, but never heard one of them to express fear of any kind in reference to the occurrence of an explosion; they one and all, like myself, appeared fully satisfied that everything was safe. I myself have had 30 odd years' experience in mining, and considered this mine one of the safest in my district; and further I may say, that six men, all good practical miners, most of them holding certificates as underground managers and overmen, were appointed by the workmen to examine the mine, and done so only a day or two previous to the explosion. I was present and read the report the evening before the explosion; they reported everything as satisfactory. The day previous to the explosion I travelled the section of the mine in which the explosion occurred, accompanied by H. Swift, "manager," a man of large practical experience in mining both in this and the old country. We were then both satisfied everything was in good order. The above goes to prove that in our profession of miners we have something yet to learn. As the years roll on our mines are gradually becoming deeper, and the vertical pressure greater, and in my experience as the depth of the mine increases fire-damp likewise increases. It would therefore seem that vertical pressure and atmospheric pressure are both active agencies in liberating gas from the strata, if there be any pent up seeking admission into the work.

It was only two weeks after the explosion when the mine was again being partially worked, the damage underground being slight when we think of the terrible loss of life. These collieries are now comparatively clear of gas. At the working faces there are times when a few inches is found by the fire-boss, more especially in up-hill places where the brattrice is not kept close up; but as to gas being in standing places or old work, I never found it, nor do I know of any man who ever did. The overlying strata in Cumberland County does not carry fire-damp like the Pictou County coal seams. The Pictou

County coal basin has for its cover bituminous shale, while Cumberland County coal basin has more freestone and fire-clay, which accounts for being less gas than in Pictou collieries. Safety lamps is the only kind of light now used in this mine. Explosives are not used.

There has been quite a lot of work done in the air-ways, and the volume of air considerably increased. The new lift which was sunk last year in the East slope has been opened up this year, and levels driven east and west. During the year the West slope has been sunk down 1200 feet. There is also a new lift in the North slope, and one in the East slope 600 feet each, and 1200 feet in the West. Properly speaking, we do not know the extent this lift may be driven westwardly, as every year further developments are made of this seam westerly, until now they are proven for some miles with slight variations southerly, caused by up-throw dikes or faults. Easterly the No. 5 slope is proved to some extent a distance of one mile roughly speaking.

There are somewhere about 1400 men and boys employed in these mines, and when we take into consideration the hazardous nature of their employment the casualties that do occur are comparatively few. During the year there has been placed in the North slope a new duplex pump—high and low pressure, water barrel 10 inches, stroke 36 inches, water-column $10\frac{1}{2}$ inches; the pipes are lined inside with wood.

JOGGINS MINES.

All the work done in this mine during the year was long wall. It has proved very successful here, as the coal taken out under this system is larger, and a larger per centage of coal is won. I would say that 95 per cent. of all the coal is taken out, it may require more timber, but the larger per centage of coal obtained amply pays the difference. The men also can dig a larger quantity per shift than under the old system.

The water level has been cleaned and timbered from the shore to the slope, a distance of one mile and an eighth.

Formerly the road for delivering the coal at shipping, which was one mile and an eighth in length, was laid with double tracks and operated by an endless rope, the engine operating it being located at the mine. The coal was then dumped into a chute of about 150 feet in length, and run into the vessels lying at the wharf, of which only one could be loaded at a time. During the past year the whole business has been remodelled. At the wharf, instead of the chute, in the same place there has been two tracks laid, and the wharf extended, and several places made in which vessels can lie and be loaded at the same time with different kinds of coal. At the head of these two tracks is placed a drum barrel with brake attached, and the full boxes running down bring up the empty ones. Instead of two tracks from the pit and an endless rope, there is now only one track with sufficient descent in it for the full boxes to run down with rope attached, and the engine then pulls back the empty ones, thus doing away with half of the track and rope formerly used.

The mine is now in order to yield a large output of coal. There has been no gas reported in this mine during the year, and during the same time has been free from any kind of accidents.

No explosives are used in working the coal; the powder and dynamite used was in stone, and in cutting through a large fault in three places, and some brushing for horse roads.

MINUDIE.

This mine was worked for two or three months last winter, and then remained idle until the middle of November, when it was started again with 10 or 12 men, the object being local sales for the winter.

LAWSON MINE.

This mine was idle for two or three months during the summer on account of their engine house being destroyed by fire. It has been rebuilt, and the mine at work again with from 8 to 10 men employed in it.

CHIGNECTO MINES.

This mine was worked during the winter along the crop, a few men being employed getting out coal for local sales. In the spring Frank Burrows, the underground manager, started prospecting the property. He was supplied with a Diamond drill, capable of drilling 1000 feet, and had 10 to 12 men employed, and has up to my last visit, December 1st, continued at work, and has drilled a series of holes from near Athol station to the Stoney half-mile. I learned he had drilled through some of the coal measures. He has now drilled three holes of about 600 feet depth each, and has begun to drill the fourth.

SCOTIA.

Alexander Dewar, reported as having 3 or 4 men employed at this mine, ceased operations at the end of the year, and has not resumed since.

BLACK DIAMOND MINE.

Principally pillar work done here during the year. They are getting along very successfully and mining a good per centage of coal. It is now under the management and control of the Acadia Coal Company, Limited.

EAST RIVER AREA.

John Muir and Sons.—Work has been carried on here just as usual.

On July 17th I visited Sydney Mines, C. B., in company with Mr. Patrick Neville, Deputy Inspector of Mines. After examining the mine report book, we selected No. 1 South new angle dip, where gas had been reported previous to my visit. We found everything in good order and no gas. We tested with Leving's Gas Indicator, and the most we could find was $\frac{1}{2}$ p. c. in the "return" from South new

angle dip. The air-ways, as far as I seen, were in good condition, and the mine was fairly damp, except the hauling roads which were dusty, and I think might be watered. There is in this mine a very large waste, or standing work, which I did not see, and cannot say anything about it. What I did see was in good order, except the dust on the hauling roads.

On November 28 and 30 I visited Leicester in Cumberland County, where coal was reported to have been discovered. I found Mr. Sharp at work with 6 men east of the Styles mine, on the bank of a brook. He had 5 seams of coal exposed; about sixty feet of measures were between the first three seams, which appeared in thickness to be as follows: 1st seam, 3 feet; 2nd seam, 5 feet, 4 inches; 3rd seam, 3 feet, 6 inches. Then 107 yards south were the other two seams, one 6 feet and the other 9 feet, dipping south 10° west at an angle of 45° .

There are good indications further east, lots of drift coal on the surface and a good level country. I cannot probably do justice to this section of the country, as the crop-out of the seams appeared disturbed. I never seen any coal burn better than it does in a stove.

I would further say that a very familiar form of accident in all our coal mines is caused by coal falling from the working face. This, in my opinion, can be remedied to a very great extent, by first, the management strictly enforcing the proper timbering of places, and secondly, making it the duty of their officials when visiting a working place, not merely to ask the men how they are getting on, but to look and ascertain if the place is properly timbered, and if not, to cause that it be done at once.

Another familiar form of accident is the "trapper boys" either jammed by boxes, or trampled on by horses. The cause is in many instances leaving their doors to gratify some curiosity, or in visiting the next trapper, but more frequently by going to shift points or some other duty for the driver. These are two of the most familiar form of accident met with, and they, I have no doubt, can be greatly decreased by the management preserving strict discipline and rigidly enforcing the laws. So far we have been very fortunate from accidents by raising or lowering men in slopes, as every practicable provision has been made for safety. This, however, is not so in our perpendicular shafts. No provision has been made in them to meet such accidents as over-drawing or breakage of rope, and the time has now come, in my opinion, when some protection should be made to meet such kind of accidents, and appliances such as King's Patent Detaching Hook, or some other of a like nature of equal or more value, should be in constant readiness to meet with such accidents.

Herewith accompanying are the usual statistical information.

I have the honor to remain,

Your most obedient servant,

WILLIAM MADDEN, JR.

LIST OF ACCIDENTS FOR THE YEAR 1891.

Number.	Date.	Mine.	Name.	Occupation.	REMARKS.
1	Jan. 7.	Spring Hill, No. 3.	John Palmer.	Loader at chute.	Hand smashed between timber and boxes.
2	" 9.	" "	Fred. Carmichael.	Miner.	Collar bone broken; fall of coal from working face.
3	" 31.	Forrd Pit.....	Joseph Keefe.	Shiftman.	Leg broken; timber fell on him.
4	Feb. 17.	Spring Hill, No. 1.	Fred. Mumford.	Miner.	Collar bone broken; fall of coal from working face.
5	Mar. 14.	McGregor Pit....	William Frew.	Miner.	Leg broken; fall of coal from working face.
6	" 20.	" "	Guthrie Munro.	Loader.	Foot badly smashed; a piece of coal fell on it.
7	June 5.	Spring Hill, No. 2.	John Lodge.	Loader.	Hurt by fall of coal in sinking slope.
8	July 15.	" "	Adam Porter.	Miner.	Hurt by roof stone falling on him.
9	" 15.	" "	John Shannahan.	Driver.	Hurt; slipped in front of box.
10	Aug. 28.	" "	Neil McDonald.	Miner.	Leg broke; fall of coal from working face.
11	Sept. 12.	3rd Seam, Albion Mines.	Hector McKenzie.	Miner.	Strained his ankle; getting off riding rake.
12	Oct. 1.	Black Diamond.	Ed. Sutherland.	Miner.	Leg broken; fall of top coal.
13	" 15.	Spring Hill, No. 2.	Thos. Shields.	Laborer.	Leg broke; box accidentally leaving track on level.
14	Nov. 5.	" "	Wm. McDonald.	Cage-runner.	Hurt; cage left the rails.
15	" 6.	" "	D. McMillan.	Driver.	Arm badly smashed; caught between prop. and rake of boxes.

Amounts of air measured at visits to Mines in Pictou and Cumberland Counties, 1891.

NAME OF MINE.	Jan.	Feb.	Mar.	April.	May.	June.	July.	August.	Sept.	Oct.	Nov.	Dec.
Acadia	62,000	60,100	64,000	61,740	60,500	60,000	62,200	58,000	59,100	60,250	58,900	54,500
Black Diamond	13,200	17,100	15,000	14,700	14,850	14,000	13,900	14,200	14,000	15,000	25,000	24,500
Drummond	82,200	84,000	82,500	81,900	80,000	78,800	76,750	68,800	70,200	74,900	81,700	80,700
Scott Pit	10,250	9,400	13,500	14,100	13,700	13,500	12,900	7,170	8,900	Idle.	.....	.....
Six Feet Scam, Vale	38,000	35,500	42,000	42,500	36,500	28,300	28,250	32,200	32,700	30,000	31,200	32,000
John Muir & Sons	1,000	1,150	2,000	2,000	1,700	1,200	1,000	1,150	1,400	1,350	1,464	1,250
McGregor Pit	96,550	94,250	99,500	97,700	98,500	90,500	100,000	84,700	89,700	97,950	102,000	100,000
Thorburn	31,000	30,000	32,500	37,500	34,800	.....	37,000	42,000	41,700	37,500	38,900	37,700
Foord Pit	33,000	32,200	.....	.....	.....	25,600	.....	.....	.....	22,500	20,000	.....
English Slopes	Idle.	.....	.....	.....	.....	.....	.....	.....	.....	4,250	4,000	4,100
Lawson	1,700	.....	Idle.	4,275	4,000	2,100	1,200	1,000	1,200	1,350	1,500	1,460
Minudie	1,000	Idle.	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,260
Joggins	38,200	Idle.	35,700	36,900	32,200	30,100	30,000	28,500	30,200	30,500	33,500	32,900
Spring Hill Mines :—												
No. 1	72,500	75,700	78,100	76,500	75,900	72,600	68,700	67,900	73,100	76,700	80,000	87,400
No. 2	60,000	62,000	60,900	57,500	59,800	57,950	52,780	53,100	54,300	53,200	54,700	52,000
No. 3	52,700	53,000	53,700	51,800	57,600	53,300	53,300	52,700	53,950	54,900	53,800	52,200

OFFICIAL VISITS, YEAR 1891.

MINE.	Jan.	Feb.	March.	April.	May.	June.	July.	August.	Sept.	Oct.	Nov.	Dec.
Acadia, Westville.....	1	3	28	20	25	15	6	28	17	{ 13 } { 28 }	5	23
Black Diamond, Westville....	6	.....	21	21	16	2	1	24	10	17	4	17
Drummond Colliery, ".....	8	2	26	22	15	5	3	27	11	15	18	14
Scott Pit, Westville.....	8	2	26	Idle.	15	5	3	27	11	Idle.	.....	.....
Six Feet Seam, Vale, Thorburn	10	9	25	25	20	9	7	18	22	26	19	22
John Muir & Sons, E. Riv. Area	10	9	25	25	20	9	7	18	22	26	19	22
Haliburton Mine	9	.....	Idle.	.....	.....	.....	.....	.....	.....	.....	.....	.....
McGregor Pit, Stellarton.....	12	6	23	24	18	6	Idle.	26	15	20	17	16
Thrd Seam, ".....	12	6	Idle.	3	19	Idle.	9	25	12	19	16	15
Foord Pit, ".....	28	.....	18	3	22	27	.....	Idle.	13	Idle.	2	.....
English Slopes, ".....	Idle.	.....	.....	.....	.....	.....	.....	.....	.....	20	16	15
Chignecto Mines, Cumberl'd Co.	17	Idle.	.....	13	Idle.	.....	Idle.	.....	.....	.....	.....	.....
Lawson Mine, Maccan Station	19	13	11	13	22	Idle.	5	4	Idle.	Idle.	6	.....
Minudie Mine	20	.....	Idle.	.....	.....	.....	.....	.....	.....	.....	.....	.....
Joggins Mines	20	Idle.	12	10	12	22	28	4	5	6	7	1
Spring Hill Mines, No. 1 Slope.	15	20	9	7	11	19	25	.....	2	7	9	2
" " No. 2 ".....	15	21	9	8	8	19	25	.....	2	7	9	2
" " No. 3 ".....	16	19	13	9	9	18	24	.....	1	8	10	3

Table shewing number and lineal feet of Props and Rooms, and quantity of Explosives used at each Colliery during Year 1891.

MINE.	PROPS.			ROOMS.			EXPLOSIVES.		
	No. of Pieces.	Lengths.	Lineal Feet.	No. of Pieces.	Lengths.	Lineal Feet.	Powder, lbs.	Roburite, lbs.	Dynamite, lbs.
Chignecto .....	.....	.....	2,000	.....	.....	.....	150	.....	.....
Drummond Colliery .....	.....	.....	196,100	.....	.....	.....	260	81	.....
Acadia .....	.....	.....	317,284	.....	.....	.....	.....	.....	.....
Albion .....	.....	.....	99,401	.....	.....	.....	12,100	6,000	.....
Vale .....	.....	.....	227,343	.....	.....	.....	26,717	.....	.....
Joggins	27,000	8'	216,000	}	.....	.....	200	.....	150
.....	25,000	4'	100,000		.....	.....	.....	.....	.....
.....	3,000	6'	18,000		.....	.....	.....	.....	.....
Lawson	12,000	2' 6"	30,000	.....	.....	.....	225	.....	.....
Minudie	1,300	6'	7,800	.....	.....	.....	360	.....	.....
John Muir & Sons .....	.....	.....	7,000	.....	.....	.....	550	.....	.....
Scott Pit, Drummond Mine .....	.....	.....	.....	.....	.....	.....	2,687	942	.....
.....	23,900	10	239,000	3,080	10	30,800	.....	.....	125
.....	51,370	12'	616,440	32,300	14	452,200	.....	.....	.....
.....	.....	.....	.....	{ Extra heavy.		.....	.....	.....	.....
.....	.....	.....	.....	.....	12	.....	.....	.....	.....
.....	.....	.....	.....	.....	14	.....	.....	.....	.....
.....	.....	.....	.....	.....	18	44,775	.....	.....	.....
Spring Hill Mines .....	.....	.....	.....	2,985	.....	.....	.....	.....	.....
.....	.....	.....	2,076,368	.....	.....	527,775	46,787	7,025	275

CAPE BRETON COUNTY.

The total sales for this County were 982,392 tons against \$16,994 tons in 1890.

The increase was principally in the home sales and those to the Province of Quebec.

During the past year the Gardener mine was got into good working order by the Burchell Bros., who introduced a Jeffrey's electrical coal cutting machine. The Sydney and Louisburg Coal and Railway Company re-opened the Emery seam. Both these mines are said to yield a coal adapted for steamer uses. Preparations are being made for introducing mechanical coal cutting machinery into several mines in the Cape Breton district. As a result of the construction of the Cape Breton Railway coal from this district is burned on the Eastern Extension Railway.

The production of the Collieries is for the year 1891, was as follows :

COLLIERY.	RAISED.	SOLD.
Bridgeport.....	30,897 tons.	32,547 tons.
Caledonia.....	159,985 "	144 995 "
Gardener.....	18,746 "	17,105 "
Glace Bay.....	117,767 "	110,212 "
Gowrie.....	158,064 "	152,367 "
International.....	133,179 "	124,677 "
Ontario.....	3,111 "	2,709 "
Reserve.....	170,844 "	154,656 "
Sydney.....	170,691 "	146,645 "
Victoria.....	111,037 "	96,479 "

Prospecting was carried on at several points in Cape Breton County, and it is claimed that a new and workable seam has been found underlying the Gardener seam. Such a seam would prove, owing to the great extent of country it would underly, a great addition to the coal resources of the Island.

At East Bay, Mr. Young, on behalf of some American capitalists, has been engaged in sinking on a bed of hard coal, and will continue with better sinking appliances in the spring.

The Mabou Gypsum Company have opened one of the Mabou seams and sold a few tons. The seam is $7\frac{1}{2}$ feet thick and of good quality. A wharf has been built, and it is expected that next summer a considerable trade will be done with Nova Scotia and Prince Edward Island.

I append Mr. Neville's report on his inspections during the year 1891.

BRIDGEPORT, Dec. 31st, 1891.

E. GILPIN, ESQ.,

Deputy Commissioner and Inspector of Mines:

Dear Sir,—I beg leave to forward you a report of my inspection through the Cape Breton coal mines, during the year ending December, 1891.

SYDNEY MINES.

The north side pump deep has been driven further to the dip and a new landing opened there, two hundred and ninety-one yards below the old landing. No. 1 angle deep, south side of pit bottom, has been driven through the trouble and extended, so that a new landing has been opened at three hundred and thirty yards further to the dip than the old landing, also No. 2 angle deep south side, has been extended and a new landing opened out three hundred and thirty yards further to the dip than the old one.

A new and larger spur wheel has been put on the north side underground engine to increase its hauling capacity. A new Jack engine drum and ropes have been put in for lowering and drawing the men from the pit. Also the back of the cages are boarded in and an iron bar placed across the front for safety.

The ventilating fan has been much improved in efficiency, by tacking sheet rubber to the periphery or margin of the blades, also by enlarging the outlet for the escaping air. A second new apparatus has been erected to help the filling away of the bank coal during shipping season. Cast iron tubing has been provided with which to line the pumping shaft at points where the stone is wasting away, by reason of the heat from the steam of the underground engine.

The heapstead pit tops, boiler seats, and engine houses, have been lighted by electric lights. A small horizontal engine and dynamo have been put up for that purpose, all of which gives satisfaction.

VICTORIA MINES.

Work has been brisk at this mine during the last season. Since my last report the east levels in the 1800 feet lift has been driven 380 yards, and another balance has been driven up. The west levels in the same lift have been driven about 150 yards; and a balance won out. The 1200 feet east levels have also been extended about 400 yards.

Stooping has been successfully carried on during the shipping season. A new angle deep is being driven off the main east slope, at a much lighter angle of dip, for the purpose of shortening the haulage in the level by horses; and also to enable the surface hauling engine to bring out a much larger trip of coal each time. The west levels in the 1200 feet lift in the west slope have been standing nearly all this season, and only one balance is being worked at present; but the main slope is being driven down to win out another lift of 600 feet. The new engine for the fan mentioned in my last report has been placed and working for some months.

A tubular boiler, $14\frac{1}{2}$ feet long, and five feet diameter, with 75 tubes in it, has been placed near the fan, and is quite able to supply the two fan engines with steam.

A new fan shaft, 8 feet square and 40 feet deep, has been sunk and connecting with the main airway.

The erection of another Champion or Murphy fan 8 feet diameter, has commenced. They have also put in another common Egg end

boiler, 36 feet by 5 feet 4 inches diameter, in place of two small ones. A gangway was erected in the spring between the coal bank and heapstead, and a donkey engine placed underneath it to draw the coal to the screens.

LINGAN.

A few men have been working in the pit there this season, getting out some coal which has been taken to Sydney Mines to make coke of.

GARDENER MINE.

Since last report this mine has been dried, equipped, and put in operation. Its condition was found to be better than was anticipated. Engine house, forge, office, and dwelling house are all being repaired, also a new store has been built. The heapstead has been finished, the shaft has been cribbed, buntings and guides put in. The two Cameron pumps that remained in the mine under water for about twelve years were in good condition, and with slight repairs are found to be all that is necessary for keeping the mine dry.

The air shaft has been cribbed and the water that formerly used to go down it has been dammed off. Ladders are placed in it for the workmens' convenience. In the latter part of the season the air was changed from its former course bringing it in a shorter direction to where the men work; this made a marked improvement in the ventilation.

The bottom of the main roads both north and south of the pit bottom have been blasted up, admitting the use of larger horses for hauling; also the management has disposed of the tubs formerly used in this mine, and instead are using on the south side of the pit a tub of double the capacity.

The extension of the south level and the next rooms above it shows a marked improvement in the thickness of the seam. The Jeffery coal cutting machine has worked steady since August; the results attained are satisfactory, a gradual gain is made as the men get more acquainted with the machine.

Mr. Burchell informs me that in the latter part of December a cutting of 270 square feet was made by the machine with two men in three and one half hours, which would be equal to 770 square feet in a shift of 10 hours. The electrical plant was manufactured by Messrs. A. Robb & Sons, Amherst, N. S., this plant, besides furnishing power for the machine, supplies the engine house and bankhead with electric light.

CALEDONIA.

During the last season the main or west deeps have been extended about 600 feet, and two sections on both sides won and opened there. The west high lift levels have been extended and rooms broken off. The levels on the east side from the bottom of the 700 feet deep slant have also been extended and a large section opened out.

The workings to the rise were carried on as usual. A line of stone stoppings has been built and put in place of where the wood and board stoppings were, from the furnace to the lower landing on the main

deep. A second furnace of the same size has been added to the former one ; it is built on the east side, and the escaping air goes from both, through the same shaft and cupola. This furnace ventilates the east side of the pit, and the former the west side, both having separate inlets and returns, all of which have made a great improvement in the ventilation. On surface a new building of 100 x 28 feet has been erected, to be used as a forge and carpenter's work shop. A new stone boiler house has also been built.

OLD BRIDGEPORT.

A new incline plane 900 feet long has been driven and put in operation from the south side of the pit bottom towards the rise. The south levels have been extended, and are now about 1600 feet from the bottom of the shaft. The ventilation has been greatly improved in this mine during the past season.

Stoppings have been put up along the levels, headways and through the rooms where required, also a return airway has been driven from the south side of the high workings direct to the back part of the furnace, giving two returns.

RESERVE MINES.

This mine has been worked pretty busy during the last season. The French or east slope has been driven down 350 feet further, and levels turned off south and north, the south levels were driven 600 feet, and the north levels about 450 feet. A new landing has been made there and a fine section of rooms opened out, the coal is hauled from this section by means of a new steel wire rope leading from one of the engines on surface to the low landing, the trip is taken from this landing to the upper landing, when it is caught there by another rope and engine drawing it to the surface, this works remarkable well. Very little time is lost in unhooking from the empty and hooking on the full trip, and *vice versa*. The pillars have been nearly all drawn from the west side of the main slope. Work ceased there in October. A new cupola has been built on the east side instead of the old one that was blown down in October by a heavy gale.

EMF MINES.

The dip slants have been driven about 650 feet and rooms broken off, and worked during the latter part of the season. The north levels on the high lift have been extended about 650 feet, and the south side levels 320 feet. As the dips are extended the coal seems to improve in quality and thickness of seam.

ONTARIO MINES.

Mr. Alexander McPherson commenced in the latter part of last March to secure and timber the slope and horse roads, and also to pump the water out of the dip. He succeeded while the weather remained dry, but as soon as the fall rain came he found that he was unable to keep the water down, so he finally abandoned the work. However, during the season he mined coal from a few rooms on the south side of the slope, below the high level.

GOWRIE MINES.

This mine has worked in its usual systematic way during the most part of the year. From the bottom of the west deep slant a horse road has been driven northerly over the Fault, and a pair of levels turned off and driven westerly, a distance of 300 yards, and a section won out between the Fault and the anticlinal. Also, south and parallel to the Fault the levels have been extended westerly 200 yards.

A good travelling road for the workmen has been made from this district to the high level near the pit bottom. On the east side main deep where the roof was considered dangerous 150 yards of it has been taken down an average thickness of 3 feet, and the place well secured with timber one foot or more in diameter.

The levels going east have been driven 300 yards, and those going west extended about 400 yards, those levels have struck the Fault that is leading from the west dip slant.

LITTLE GLACE BAY.

During the past year the north levels have been driven about 900 feet, the south levels have been stopped, leaving a large barrier between them and the seashore at the harbour. The management has commenced driving a new deep on the south side of the pit bottom, with the intention of gaining a lift of 600 feet.

A new shaft 40 feet deep and $8\frac{1}{2}$ feet square has been sunk as an airshaft, and an 8 foot fan placed in position, this is called the Murphy ventilating fan, and is reversible, the same as the one at the International, it works admirably well, and will be used as a blow down this winter if required.

A new double acting 12 inch fire pump, with 9 inch columns, is being put in for the purpose of relieving the pumps now in use. A new block of four tenants are added to the workmen's houses. A new block of crib work, 160 feet long, has been built and placed on the southern side of the harbour for its protection.

INTERNATIONAL MINES.

The south side slant deep road has been extended down 600 feet deep and another landing opened out there. This is the second landing on that road below the main level.

The main overcast north side of pit bottom has been reconstructed in the shape of an arch with old railroad rails bent for that purpose, they make a good strong arch and suits well where the roof is bad. They are lasting and can be moved to any other part of the pit for the same purpose if required.

An airshaft has been sunk 90 feet deep, 10 feet diameter, and an 8 feet fan, known as the Murphy ventilator, erected there. It is so constructed that it can be made to either exhaust or blow down, and is at present working as a blow down, but the intention of the management is to have it exhaust in summer seasons, it is capable of giving 80,000 cubic feet of air per minute if required. There has also been two new locomotives purchased and running during the past season in place of two of the old ones.

MCADAM'S LAKE, EAST BAY.

Prospecting has been going on at this place during part of the season by American capitalists. I visited the place on the 11th of December, and found that Mr. Young, the man in charge, had left and gone to the United States. A shaft 65 feet deep by 8 feet long, and 4 feet 6 in width, has been sunk on a seam of very black shale; there are several seams of this shale showing on both sides of a brook that runs down towards the lake crossing the strata.

CARIBOO COVE.

I visited this mine on the 18th of December and found 22 men employed there. A shaft has been sunk 130 feet deep, 14 feet by 6 feet divided in three compartments. The seam of coal that it is sunk on is called the 7 feet seam, but has not been proved as yet to be over 3 feet 9 inches thick. The coal is hard and burns well.

An new engine house has been built and a double cylinder friction hoisting engine, 35 horse power, put in position; also a pumping engine 7 inch cylinder 15 inch stroke, and a portable boiler 10 by 5 feet diameter. This engine besides pumping the water from the shaft, drives a fan which ventilates the pit.

A level has been driven from the seashore in on the 11 foot seam, a distance of 125 feet, and well timbered. A new dwelling house has been built, an office, barn, and forge. The company operating this mine reside in Rhode Island, U. S. President of the company, W. B. Gincks; Secretary, T. A. Buel; Underground Manager, James W. Wilson. The management says it is the intention to ship coal early next spring.

I would wish to make one remark respecting the accidents at Sydney Mines, where John Cann and Stephen Gillis came to their death, and was supposed to be killed in the shaft, and a verdict returned accordingly. A few days after the inquest poor Cann's cap was found on one of the buntings about half way up the shaft. This shows clearly that he must have fainted or fell by heart disease at that point, and afterwards rolled out by the motion of the cage near the pit bottom. A few hours after the inquest on the body of poor Stephen Gillis, I learned from several of the men around the works that he was subject to epileptic fits, and a few days previous to his death fell in the cage while coming to the surface, and was taken care of by a workman who was in the cage with him at the time, and was removed to the bank senseless. In conclusion, I may say that a great improvement in the ventilation has taken place in all the coal mines here during the past season, not only in the quantity of air but in the manner in which it is kept to the faces of the workings where the miners work.

I have the honor to be, your most obedient servant,

P. NEVILLE.

REPORT OF ACCIDENTS IN CAPE BRETON COLLIERIES DURING THE YEAR 1891.

DATE.	MINE.	NAME OF PERSON.	OCCUPATION.	AGE.	REMARKS.
Feb. 19 .	Sydney	John Robson	Miner	19	Leg broke in cage descending pit.
" .	"	James Evans	"	37	Ankles injured in cage descending pit.
" .	"	John W. Jobs	"	22	Slightly " " "
" .	"	James Handrican	"	25	Very slightly injured in cage descending pit.
" .	"	John McNeil	"	42	" " " "
Feb. 24 .	"	John Cann	"	40	Killed by cage when descending pit.
April 24.	Little Bay	James McNeil	"	24	Hips injured by fall of coal in room.
" 25.	Sydney	John Josso	"	36	Killed " " "
" .	"	William Merritt	"	34	Shoulder dislocated by fall of coal in room.
May 13 .	Gowrie	John Rankin	Shift-man	27	Leg broke, trip forced road switch on it.
" 16 .	Reserve	Alex. Johnstone	Loader	20	Back injured, fall of stone from roof.
" 18 .	"	Neil McMullin	Miner	30	" " " "
June 13.	Caledonia	Alex. McKenzie	Driver	15	Burned slightly on face and hands by gas.
July 11 .	Reserve	Michael McMullin	Miner	36	Face injured by stemmer shot, exploded loading.
Aug. 5 .	Sydney	Stephen Gillis	Shift-man	17	Killed, fell out of cage coming from work.
" 25 .	Victoria	John Didne	Miner	51	Leg broke, fall of stone from wall in pit.
Sept. 3 .	Caledonia	Rod. McDonald	"	21	Fell out of cage coming from work in pit.
Oct. 6 .	Gardner	Michael Gardner	"	22	Back slightly injured, fall of coal from roof.
" 26 .	Victoria	John Cashin	Loader	32	Leg broke by caddy on balance while crossing.
Dec. 7 .	Sydney	Thos. Snow	Shift-man	23	Burned slightly on face and hands by gas.

The following shows the average thickness of the coal seams now worked in the dip workings in Cape Breton Mines, and the kind of Lights and Lamps used by workmen while at work.

NAME OF MINES.	Thickness of Seam.		Lights.	Lamps.
Sydney Mines.....	5 feet.	6 inches.	Open Lights.	Common Fire Lamps.
Victoria Mines	6 "	8 "	"	"
Gardner Mines	4 "	4 "	"	"
Old Bridgeport Mines..	5 "	9 "	"	"
Reserve Mines.....	8 "	9 "	"	"
Emery Mines	4 "	9 "	"	"
International Mines.....	5 "	10 "	"	"
Little Glace Bay Mines.....	5 "	10 "	"	"
Caledonia Mines.....	8 "	6 "	"	"
Ontario Mines....	8 "	4 "	"	"
Gowrie Mines.....	5 "	8 "	"	"

Table showing cubic feet of air circulating through Cape Breton pits in 1891.

NAME OF MINE.	Jan'y.	Feb'y.	March.	April.	May.	June.	July.	August.	Sept.	Oct.	Nov.	Dec.
Victoria Mines.....	41,200	44,800	44,880	42,000	41,440	42,000	47,620	44,800	41,900	46,720	40,320	44,260
Caledonia Mines.....	42,100	40,000	30,000	47,010	57,825	55,935	54,200	44,000	49,980	48,864	46,654	50,400
Old Bridgeport	19,000	18,000	16,000	30,000	25,680	29,930	23,220	14,740	18,640	29,015	39,390	30,000
Reserve Mines.....	35,000	46,860	47,340	54,880	43,500	42,900	59,680	47,330	43,592	52,483	50,000	49,920
Sydney Mines	60,000	60,207	62,420	63,770	61,240	52,380	50,000	55,000	58,900	63,890	75,080	49,000
Little Glace Bay Mines ..	16,400	20,000	10,500	15,560	11,249	19,200	15,000	20,000	10,500	12,000	12,560	19,500
Gowrie Mines	32,200	30,100	27,000	32,000	33,410	34,910	34,000	34,150	34,850	34,938	35,328	34,000
Gardner Mines.....	10,000	10,000	15,000	18,000	24,000	23,000	20,000	22,120	18,900	10,030	11,998	12,000
International Mines.....	.....	.....	17,500	18,000	29,500	34,500	28,750	25,000	29,000	34,000	35,000	36,500
Emery Mines	15,000	15,000	18,000	27,600	18,000	16,090	18,223	18,320	18,780	18,575	18,422	18,052
Ontario Mines.....	.....	.....	2,000	6,000	5,000	5,000	5,626	6,000	5,600	5,000	5,050	.....

GOLD.

The returns for the year 1891 show that 35,212 tons of quartz were crushed, yielding 23,391 ounces of gold for 149,381 days' labor, as compared with 24,358 ounces from 41,886 tons of quartz for 160,264 days labor. It is to be regretted that there is again a slight decrease in the yield.

SURVEYS—GOLD.

Mr. Samuel Smith was employed for the surveys required in Queen's County. Mr. McCallum was employed at Rawdon.

Mr. F. W. Christie was engaged in Brookfield, Colchester Co., in making the surveys required there in pursuance of the decision of the Hon. Commissioner in the matter of the applications of O. B. Browne and others.

Mr. James Anderson was employed in making surveys for the department in Montagu, Rutherford's Mills, &c.

Surveys were also made in the Wagamatcook district by Mr. Jos. McLean of Baddeck.

Mr. C. W. Pye made a number of surveys in the Sherbrooke and Stormont districts. It was found that the starting point used for many of the surveys in the Country Harbor district was incorrectly located on the office plan. Steps have been taken with a view of effecting a readjustment of the lines of the leases, &c.

The following General Statement shows the yield of each district:

GENERAL STATEMENT SHOWING THE YIELD OF EACH DISTRICT.

DISTRICT.	No. of Mines.	Days' Labor.	Mills.	Tons Crushed.	Yield of Gold per Ton.		Total Yield of Gold.	
					Oz.	Dwt. Grs.	Oz.	Dwt. Grs.
Tangier	2	3316	1	42	0	6 6	13	3 12
Whiteburn	1	5751	2	803	1	0 6	813	12 2
Central Rawdon	1	4404	1	510	0	1 8	342	0 0
Killag	1	5375	1	379	0.	18 11	354	6 16
Oldham	2	15085	2	2019	1	9 0	2909	10 13
Cariboo }	3	14426	4	5489	0	5 1	1486	14 21
Moose River }	1	5595	1	1823	0	7 15	698	9 0
Wine Harbour	3	11065	3	1611	0	7 11	602	4 0
Waverley	1	7228	1	2432	0	6 13	800	3 0
Lake Catcha	2	18522	2	4562	0	12 16	2396	10 12
Fifteen Mile Stream	3	10154	4	1751	1	13 20	2965	5 4
Uniacke	2	5728	3	863	1	11 10	1361	1 0
Montague	2	9651	4	829	1	3 2	957	3 4
Stormont	2	17520	2	4826	0	19 12	4664	13 17
Malaga	1	10580	1	5210	0	5 9	1406	0 0
Salmon River	4	2537	2	464	0	5 3	119	5 0
Sherbrooke	3	2444	5	1399	0	5 3	361	0 4
Unproclaimed, etc.								
Total	34	149381	.....	35212	.....	.....	22251	2 9

The following returns were received after the tables were made up :

			Tons.	Oz.	Dwts.	Grs.
Dec.....	Phila G. Mg. Co's Mill...	Brookfield, Q....	150	60	18	0
Oct. Nov. and Dec..	Rossignol Mill	Whiteburn Q....	87	81	15	2
Dec.....	Rockland "	Stormont, Guys..	59½	68	9	0
Jany. to Dec.	Essex Co's Mill.....	Tangier.....	328	58	9	0
Dec.	Moose Riv. G. Mg. Co.'s Ml.	Caribou	131½	22	11	0
Oct. Nov. and Dec..	Herbert Dixon's Mill.....	"	180	214	0	0
Dec.	Withrow	S. Uniacke	95	80	0	0
Dec.	Fifteen Mile Stream ....	.....	300	154	0	0

There have been several accidents in the gold mines during the past year from premature explosions of dynamite. In each case there appeared to be a want of exact attention to the rules governing the safe use of this explosive. The explosion at Oldham appeared to have arisen from the miner, who lost his life, driving in the priming cartridge, detonator and fuse with a heavy iron tamping bar. Another accident at Salmon River on the Eastern Shore, was reported as due to the use of frozen dynamite, in defiance of the rules governing the use of explosives at the mine where the accident happened. Managers of mines where dynamite is used should be unceasing in their exertions to caution and educate their miners to the safe use of the high explosives, and they should be entrusted only to miners who are found, after due enquiry, to have had a reasonable amount of experience in handling them.

The various districts were visited by Mr. Maddin, Deputy Inspector, who reports the mines generally in fair order and safe. With respect to some mines arrangements have been made for introducing better and safer ladders. The ephemeral system of gold mining which prevails in this province, makes it very difficult for the Department to exercise anything like a close and regular supervision over the smaller mines. A small mine is rapidly opened out and abandoned within a few months. The work being tentative, little attention is paid to points which receive the attention of a manager in larger and more ambitious workings. The enforcement in all gold mines of a strict adherence to the letter of the Mines Regulation Act would require the services of a man specially devoted to the work. There should also be some system adopted of keeping a check on the work performed in the mills. At present the returns are received as made; and it is believed that there are annually considerable unaccounted for amounts of gold extracted from rich quartz by hand, on which no royalty is paid. I append Mr. Maddin's notes of his visits.

E. GILPIN, JR., ESQ.,

Inspector of Mines.

On August 4th, I visited Wine Harbor, at which place R. McNaughton was working, with Adam McGrath as under-manager. The middle lead was stripped, and operations began on the Caledonia lead; 20 men were employed underground, and 10 men over-ground. George Sutherland was fatally hurt by the dynamite exploding while charging a shot, and Edward Webber hurt.

August 5th.—At Goldenville, George Hirschfield was working in the McLean lead, employing 4 men taking out the roof quartz, allowing the waste to fall down the mine, and making an opening for water. The Sutherland and Chicago mines were idle, but the Blackie mine was at work, employing 6 men, and things appeared very dull in this mining camp. At Ecum Secum the mine was idle. There are very many complaints against so many trial pits being left open unguarded, farmers having in many instances lost some of their stock.

August 6th.—At Dufferin Mine, Salmon River, South and North leads working, and down from 250 to 300 feet; 30 men are employed. A new 20 stamp mill has been erected, a self-feeding Blake's Rock Breaker is also used at this mill, and all the machinery is run by water power.

August 7th.—Visited Tangier Mine, and found mining matters very dull. One of the old veteran miners, John Murphy, had 4 or 5 men employed on the Strawberry Hill lead, which was all the work that was being done in this vicinity.

August 8th.—At Oxford Gold Mining Company, East Chezzetcook. J. M. Reade, manager, with 31 men employed. This mine is very well equipped with good machinery. Compressed air is utilized in doing a very large amount of the works; here, on August 1st, the first accident they have had occurred. One Mike Grady on that day unfortunately had his skull fractured, a piece of plank having fallen from the bucket to which he had secured it in the shaft, and striking him on the head. John H. Anderson had 6 men employed erecting a new mill, and N. McMillan had 4 men employed opening up "Colman lead," or "Annand Mine."

August 10th.—At Montague Mines, Alex. P. McQuarrie, manager, and W. Collins under-manager, 28 men employed. They were at work taking down the old mill and preparing to rebuild and put in a new battery, and from the appearance of the mine and the push of the management, with such a body of good practical men as are here, I should think we shall have good accounts of this mine in the near future. In this district there is also the Hay mine, Wm. Skerry, manager, with 14 men employed. Here they have had a difficult task to keep the water out, but I am glad to say that at the date of my visit Mr. Skerry had almost overcome this difficulty, and was getting his mine timbered and fixed up. T. M. Baker is also at work on the iron lead, so called, employing 3 men; and Mr. Pratt is working the Sutherland mine, on what is supposed to be the iron lead, employing 3 men.

August 11th.—At Lake View Mining Co., Waverley, A. A. Hayward, manager, and Matt. Thompson, under-manager. This mine was idle at the time of my visit, but it is one of the best equipped that I saw. There are 7 drills run by compressed air, one of Gates' Rock Breakers, self-feed; 30 Stamp Mill; Boilers, 280 H. P.; Mill engine, 230 H. P.; Hoisting engine, 130 H. P.; Pump engine, 25 H. P.; a Compressed engine, 50 H. P.; Shaft, 300 feet depth; Self-dumping skips. This mine did employ 50 men. The water was out when I was there, affording an opportunity of travelling all through it.

In this District there is also the West Waverley Mine, John Hardman, manager. Some 30 men employed. The mine was idle, but the men were employed erecting new mill and new hoist. Windsor Junction Mine, Capt. George McDuff, manager. Some sinking has been done here.

August 12th.—Visited Renfrew Mine, R. S. Turnbull, manager, A. Manning, under-manager. Mine down 400 feet, and in good order and condition.

August 13th.—At Gay's River Mine, R. R. McLeod, manager, with 40 men employed. A 50 Stamp mill has been erected; this mill was built by the Truro Foundry Co. The gold is obtained here chiefly from the surface. It is not a quartz gold bearing mine, but is more of a placer mining that is carried on here.

August 14th.—Visited Moose River, Mr. Touquoy, manager. 17 men employed. A 15 Stamp mill and 3 pumps run by water power, with plenty water to run as many more. In this district A. McGregor and Wm. Bruce are working on the Moose River property, with 10 men employed.

August 15th.—At Caribou District, L. L. Wordsworth, manager. This mine is down some 400 feet, and at the date of my visit was very poorly timbered. I did not see the manager, but left word with one of the employees for him. In this district, Mr. Dickson is doing a very good paying work, and his mine was in good shape.

The mines which I have visited to this date were all well ventilated and timbered, with one or two exceptions. I may, however, say that instead of hanging ladders on the foot wall in those mines where the angle is so high, it would be much better to hang them lengthways on the lead, they would then have more slope. At present in many of the mines the ladders are nearly perpendicular, in distance ranging from 50 to 200 feet, and no means provided to save a man if he were accidentally to stumble and fall. I am pleased to say that very few accidents have occurred, but as the shafts are gradually becoming deeper, the time has arrived when such a preventative to accidents as I have suggested should be adopted.

December 7th.—I visited the following gold mines in Queen's County: Whiteburn District, Rossignol Mine. This mine has been idle for some time, and is just getting fairly started. F. B. Murchay, Esq., manager, says he expects to do well this winter. There are 20 men employed, and have a 10 stamp mill running, and everything looks well about the mine.

Whiteburn Mine,—Partinger, manager, Michael Kelly, under-manager, with 40 men employed. The shaft is 200 feet deep, and well timbered. 10 stamp mill. The perpendicular lead or mine is idle, the manager is prospecting close by the old shaft. Everything looks satisfactory around this mine.

December 8th.—Visited Malaga Gold Mining District, G. A. Wade, manager, John Thornholm, under-manager. 27 men employed, 2 shafts working. Main shaft 200 feet deep. The travelling way is the best I have seen; the ladders are at an easy angle, and stages every 20

feet. I was informed there were 3 or 4 men hurt by an explosion of dynamite last March at this mine. The magazine is attached to the blacksmith's shop, and a young man was asked to take a shot down the mine. He went into the building with his burning candle, setting fire to the fuse of the prepared shot. It was contrary to orders for any one to go into this place except the bankmen, and no light other than a lantern was allowed. The blacksmith lost his foot; his name is Alex. McInnis; James Boldin, night boss, was hurt, and Thomas Moore, who was visiting the mine, lost his eye. This is the only accident in this county I could hear of. North of this F. H. Ballou is working, employing some 30 men; his travelling way is very good. I may say all the travelling ways in this county are good. A little east of this, Charles McLeod is working in the Nine Bolder lead, so called, employing 8 men. The Caledonia Mine is idle, their mill house was accidentally burned some time ago. The Parker Douglas is also idle, which makes business somewhat dull in this locality.

December 9th.—I visited Brookfield Mine, G. A. Kenty, manager of the Philadelphia Gold Mining Company; they employ 30 men; 3 shafts working; the main shaft is down 200 feet. All the mines in this county are in good condition, but have not so many men employed in this district as were last year.

I may say it has hitherto been the prevailing system in the Gold Mining industry in this Province, when the work arrives at a distance of from 200 to 400 feet, to cease operations, the operator in many cases being unable to go deeper on account of the inadequacy of the machinery to go to any greater depth, and because of the fear that at any "greater depth," gold ceased to be found. I have learned that at Goldenville, however, a shaft has been sunk to a depth of some 600 feet, and paid to the last inch. In my opinion there is very great room for the supposition that some of the most valuable properties in this Province are being virtually lost, unless some means be adopted to encourage the operators to prospect some property at a depth of from 1,000 feet to 2,000 feet.

I am, Sir,

Your most obedient servant,

WILLIAM MADDEN, JR.,

Deputy Inspector.

MISCELLANEOUS.

SCHOOLS OF INSTRUCTION FOR MINERS.

During the year 1890 Instructors were appointed at several Collieries for the purpose of preparing candidates desirous of presenting themselves as candidates for certificates of competency as underground managers and overmen.

The following list shows the localities where schools were opened, and the names of the instructors:—

Westville.....	J. W. SUTHERLAND.
Thorburn	PETER McMILLAN.
Springhill.....	W. B. WILSON and A. D. FERGUSON.
Reserve Colliery	ISAAC GREENWELL.
Glance Bay	DAN. HARDY.
Joggins	T. BLACKWOOD,
Low Point.....	JOHN WEIR.

By error in the Mines Report for 1890, page 28, Thompson Fletcher was referred to as having received a certificate of service as manager instead of underground manager.

At an examination held May 27, Joseph Quigley, Westville, and Frank W. Crawford of Westville, received certificates of competency as underground managers, and Alex. D. Ferguson of Springhill, received a certificate of competency as overman.

At an examination held October 13th, the following received certificates:—

OVERMAN.

ROD. D. CAMPBELL.....	Little Glance Bay.
DOUGALD MCADAM.....	"
DAN. J. MERLIN	"
JOHN FLETCHER	Springhill.
NORMAN MCLEOD	"
JOHN J. McKENZIE	"
JOHN MCKENZIE	Joggins.
R. WEEDIE	"
GEORGE WALKER.....	"
BENJAMIN SMITH.....	"
ALEXANDER MCAULAY	"

UNDERGROUND MANAGER.

NEIL F. McNEIL	Glacé Bay.
NEIL J. GILLIES	"
JOHN McINTOSH	"
JOHN FIELDING	Reserve Mines.
THOMPSON FLETCHER.....	"
EDWARD ROGERS.....	"
DAV. WILSON	Lorway Mines.
JOHN JOHNSTON	Westville.
DAVID A. PATON	"
WALTER A. SUTHERLAND	"
EDWARD S. SUTHERLAND	"
JOHN McDONALD.....	"
THOMAS HALE	"
DONALD FERGUSON.....	Low Point.
ANGUS R. McDONALD.....	"
PETER CURRIE	"
JOHN HILL	"
ALEXANDER D. FERGUSON	Springhill.
MALCOLM BLUE	"
WILLIAM REESE	"
GEORGE WILSON	"
WILLIAM LORIMER	"
MALCOLM McMILLAN	"

As night schools have been established at many of the collieries, it has been suggested that the schools of instruction for the year 1892 be not established until midsummer, and that the annual examination be held towards the close of the year. It has been found by experience that during the summer months proposing candidates, being in many cases actively engaged in coal mining, do not derive as much benefit from the schools of instruction as they would during the winter months, when work is not equally brisk.

CERTIFICATES TO SHOTFIRERS, ENGINEMEN AND MINERS.

By legislation passed during the session of 1890, several important amendments were made to the Mines Regulation Act. Among them, Section 7 of the Act in question was amended to read as follows:—

“Where there is a shaft or inclined plane, or level in any mine, whether for the purpose of an entrance to such mine, or of a communication from one part to another part of such mine, and persons are taken up or down, or along such shaft, plane, or level by means of any engine, windlass, or gin driven or worked by steam, or any mechanical power, or by an animal or manual labor, a person shall not be allowed to have charge of such engine, windlass, or gin, or of any part of the machinery, ropes, chains, or tackle connected therewith, unless he be a male of at least eighteen years of age. Nor shall any person have charge of such engine, windlass, or other hoisting apparatus, unless he has undergone an examination by a person or board to be appointed by the Governor-in-Council, and holds a certificate of competency based on such examination.”

Certificates of service may be granted until January 1st, 1892, and this section shall not go into operation until that date. Sub-section 17 of Section 25, (General Rules), was also amended to agree with this.

Section 40 of the same Act was amended by adding the following :

“ And in no mine to which this chapter applies shall any person not now employed as a miner be ‘given the picks’ to work as a miner unless he has been employed in a mine, in some capacity for the space of one year. No one shall be given charge of a ‘working face’ in a mine who has not worked previously in a mine for the space of two years, nor shall any one now a miner be employed after the first of January, to mine coal, who is not a holder of a certificate of service; and no one not now a miner shall be ‘given the picks,’ to work as a miner, until granted a certificate of competency after examination by the Board of Examiners appointed for the purpose of granting certificates as managers, overmen, or shot firers, or by an examining board to be hereafter appointed, who shall have power to frame laws and conditions under which said certificates shall be granted.”

Provision was also made that the men known as “shot firers,” should also in future be holders of certificates, granted by the boards appointed for granting certificates to miners.

The following copy of an Order-in-Council, passed November 19th, 1891, will show the general instructions given to the Examiners:—

Copy of an Order-in-Council, passed at Halifax on the 19th day of November, 1891, and approved by His Honor the Lieutenant-Governor.

For the carrying out of sections 5, 11 and 15 of an Act to amend Chapter 8, Revised Statutes, “Of the Regulations of Mines,” passed on the 19th day of May, A. D., 1891, it is ordered that:

Daniel Nicholson and Angus McLeod, of Cow Bay; Andrew Lynk and Neil McKenzie, of Caledonia Mines; Neil J. Gillies and Daniel Merlin, of Little Glace Bay; John Caddigan and Coll McDonald, of Bridaeport; Bartholomew Connors and Angus R. McDonald, of Victoria Mines; David Wilson and Edmund Cussack, of Reserve; J. P. Boutlier and Isaac Greenwell, of Old Bridgeport and Gardener Mines; Robert Way and William Diggins, of Sydney Mines (all of the County of Cape Breton);

John Fletcher and Edward B. Paul, of Springhill; Thomas Blackwood and John Nolles, of Joggins (all of the County of Cumberland);

James Dunlop and William Gray, of Westville; Neil A. Nicholson and Donald C. McDonald, of Stellarton; Peter McKay and Neil McDonald, of Thorburn (all of the County of Pictou);

Be Examiners in their respective districts, as defined from time to time by the Commissioner of Public Works and Mines, for the purpose of granting Certificates to Miners and Shotfirers.

The persons so appointed shall form the Board of Examiners for their respective districts, and shall hold, as often as may be required,

examinations, at which persons desiring certificates of competency shall present themselves. The examinations shall not be by written answers to questions, unless so required by the Commissioner of Public Works and Mines. The examinations must show, to the satisfaction of the examiners, that the candidate possesses a knowledge of ventilation, modes of working coal, of timbering, of gas of safety lamps, of the requirements of the Mines Regulation Act and Special Rules, sufficient to enable him to work properly as a miner or shot-firer, before a certificate be granted.

In the case of applications for Certificates of Service, the examiners shall satisfy themselves of the *bona fides* of the applicants, and may require such proof of service as is necessary for carrying out the requirements of the law in this respect. The examiners shall not grant a certificate of service or competency to any person of known bad character, and a certificate may be cancelled or suspended by the Commissioner of Public Works and Mines, upon representation to him by a board of examiners that the holder of such certificate is guilty of drunkenness or other misconduct, and a board of examiners shall, to enable it to report to the Commissioner of Public Works and Mines, make enquiry forthwith into the truth of any such charge brought to its notice.

The fee to be paid by each person receiving a certificate shall be twenty-five cents, to be paid to the examining board, and to be divided between the two examiners. The forms of certificate, registration, etc., shall be such as the Commissioner of Public Works and Mines may from time to time direct. The certificates, books and forms will be provided for the boards of examiners, and an annual allowance of \$5.00 will be made to each board of examiners for postage and stationery, but all other expenses will be defrayed by each board.

The Commissioner of Mines may make such rules for the boards of examiners as may be found necessary for carrying on their work, and these rules may be, at any time, revoked or changed, or new ones made by the Commissioner of Public Works and Mines, who shall have power to do whatever is herein overlooked, or may hereafter be required, for the more efficient carrying out of the law.

It is further ordered, that:—

John Elliott, of Sydney Mines, in the County of Cape Breton ;
James Floyd, of Westville, in the County of Pictou ; and
Daniel Murray, of Springhill, in the County of Cumberland ;

Be Examiners for the purpose of granting certificates to engine men in their respective districts, as may from time to time be defined by the Hon. Commissioner of Public Works and Mines. With respect to persons appointed as examiners for granting certificates to engine men, they shall be guided by the general instructions to examiners for certificates to miners, contained in this Order-in-Council.

No examiner shall grant a certificate of competency to any engine-man unless he be satisfied that he fully understands his work. In the case of any charge of drunkenness or misconduct on the part of a

holder of a certificate as engineman made to an examiner, the Commissioner of Public Works and Mines may appoint some person, and the examiner and such person shall investigate such charge and report to the Commissioner of Public Works and Mines, who may thereupon suspend or cancel such certificate.

The examiners for granting certificates to enginemen shall receive pay at a rate not to exceed five dollars a day, including expenses, for each day occupied in examination business, in such manner as may be prescribed by the Commissioner of Public Works and Mines, who shall also fix the fee to be paid by each candidate receiving a certificate of service or competency.

The necessary forms, books, returns, etc., will be provided for each examiner, and an annual allowance of \$5.00 will be made to each examiner for postage and stationery, but all other expenses will be borne by the examiner.

The Commissioner of Public Works and Mines is hereby authorized to take such further steps as may be necessary for the proper carrying out of the provisions of the Act in this respect.

I believe that at this date all who were entitled to certificates of service have received them. As many miners in Cape Breton have not had any opportunity to familiarize themselves with fire damp, safety lamps, etc., instructions were given to the examiners to let each miner's certificate show what his attainments were in this respect, so that he could afterwards have his certificate changed on becoming practically acquainted with fire damp.

The legislation of the last session in respect to the use of gunpowder in mines was important. It having to a certain extent been admitted in the Pictou Collieries that gunpowder was not safe, the use of roborite, a so-called flameless explosive, was introduced. The explosion of last February at Springhill was directly attributable to gunpowder. The principle laid down in the legislation of last year was, that when mines exuded a certain amount of gas gunpowder should not be used while the miners were in the pit. The next question involved was the degree at which the line was to be drawn. It was suggested that districts or mines should be denied the use of gunpowder either in the *ipse dixit* of an inspector, or on the return air containing over a fixed percentage of gas. Finally, to adopt a standard intelligible to the managers and workmen, the two parties most directly interested, it was enacted that it should not be used in general practice at the working faces during two months after inflammable gas in quantity sufficient to show in a safety lamp has been found in three consecutive days in any mine. This provision would exclude gunpowder from nearly all the mines on the mainland, and possibly from some of the Cape Breton mines. It will be observed that no legislation has been proposed as to dusty coal mines, as the Royal Commission in England on Coal Dust in Explosives is taking evidence, it was thought advisable to see what conclusions were reached by it.

It is a question if the limit of safety laid down is restricted enough. It is apparent from a study of the limitation that a mine may have a very perceptible percentage of fire-damp floating in the

air, and yet if the ventilation is good and well conducted, and the workings carefully driven, it might be possible that gas would not be found on any three consecutive days. The consensus of independent mining opinion tends strongly to the conclusion that in any coal mine in which gas, even in small quantities, and dust are present, no gunpowder should be used. In this connection I append the report of the Prussian Fire Damp Commission on the Use of Explosives and Ventilation in Fiery Mines.

FUNDAMENTAL PRINCIPLES FOR THE WORKING OF FIERY MINES.

1.—General Rules.

1. Those mines are said to be fiery where firedamp has made its appearance during the course of the last two years.

2. In every fiery mine there ought to be at least two communications between the top and the bottom, separated the one from the other by an adequate mass of rock. One of these orifices should serve for the entry of the air, the other for its outlet. Exceptions to this rule are admissible under certain conditions.

2.—Management of the Air-current.

3.—In every fiery mine, it is necessary to make such arrangements as will ensure a regular ventilation; so that under normal conditions, firedamp shall not be allowed to accumulate in any accessible workings, and that also all the roads and working places shall be maintained in conditions suitable for working, and for circulating the air-current. Extensive mines should be divided into districts, independent of each other as regards ventilation. It is advisable to keep plans of the ventilation.

4. The exclusive use of natural ventilation is inadmissible. The same must be said of ventilation produced solely by means of the chimneys of steam generators. The use of ventilating furnaces can only be allowed under certain conditions, viz., that the furnace is supplied with pure air, a means of retreat afforded to the stoker in case of need, and arrangements made to prevent the inflammation of the air-current issuing from the mine, through contact with the gases of the furnace. The use of naked coal pans should be prohibited.

5. The amount of fresh air to be circulated per minute in a fiery mine should be calculated for each current, according to the average daily production of the working-place which it ventilates, at the rate of $1\frac{1}{2}$ cubic metres per ton. If this volume is insufficient, in order to reduce the amount of firedamp in the return-airway to $1\frac{1}{2}$ per cent. the amount should be increased. On the other hand, when the proportions of firedamp and carbonic acid in the return airway do not amount to $1\frac{1}{2}$ per cent., the volume of fresh air may be reduced to 1 cubic metre per ton of coal brought down. In all cases the volume of fresh air should not be less than 2 cubic metres per man at the most populous station, one horse reckoning as four men.

6. The motors employed for circulating the air-current should be able, at any time, to immediately increase the minimum quantity of air mentioned above 25 per cent. The use of a registering and controlling apparatus is to be recommended.

7. It is necessary (at least in new levels and shafts) to give to the main air roads a transverse section at least of 3 square metres. At all events the galleries and other ways traversed by the air-current should be proportioned in such a manner that, with a sufficient quantity of air, the rapidity of the air-current should not surpass 240 metres per minute at the entry, and 360 minutes at the outlet. Usually it is advisable, by increasing the size of the sections and dividing the current, to obtain still less rapidity. The auxiliary use of perforated airholes is likely to be of service.

8. The ventilation should be managed, both as a whole and in detail, in such a way that the current of fresh air descends from the surface by the shortest way, until it reaches the level of the working vein, and afterwards each current should flow in an upward direction through the different sections of the mine. Ventilation downwards should only be permitted in exceptional and particular cases.

9. The number of working-places that one and the same current may ventilate, must be determined by the fact that in its passage through the last working-place the current should still retain its desirable purity and freshness. Every current of air which has become considerably vitiated should be directed as quickly as possible towards the outlet of the mine, and should be prevented from passing through any other working-place.

10. Particular attention should be paid to the management of the air-current at the working-face. The ventilation of any gallery more than 20 m. in length should not be obtained by simple diffusion only. Headings should not be driven towards the rise without possessing independent means of ventilation; and in descending galleries, independent ventilation should be set up when the gallery has reached a length of 15 m. The gradient in direction of galleries should not be greater than 1 in 100. For ventilating isolated workings the Commission recommends the use of independent ventilation obtained by means of compressed air, and also by the Koerting and other apparatus of a similar sort.

Care should be taken to see that fans with arms are set up in the fresh air current. Every gallery or communication which has become useless for ventilation, should be closed up as hermetically and in as durable a manner as possible.

11. Air-gates should be so arranged that they close automatically, and should be set up at those points where an hermetic stoppage is necessary. If they must of necessity be frequently opened there should be two at least set up at an adequate distance each from the other, so that one of them may be kept continually closed.

Gates that have become useless should be done away with.

12. There should be no modification of any of the arrangements for the management of the ventilating currents without a special order from the person whose business it is to see after the matter. Any deterioration in a partition, gate, or pipe, or any irregularity in the ventilation should be immediately brought to the notice of the official.

13. Every inactive part of the mine should be closed up in such a way as to be easily recognized by the miners, and access to it prohibited.

14. The escape of firedamp from abandoned workings should be prevented either by damming them up completely or ventilating them.

15. Each working-place should be carefully inspected to make sure of the absence of firedamp before the men are allowed access to it.

16. In the event of stoppage or important derangement of the ventilation, the men should be quickly withdrawn from dangerous points, and not allowed to return before an examination has proved that the working may be resumed with safety. As soon as a sign of danger (serious accumulation of firedamp) is perceived in any working place whatever, the miners should close the way to it, warn their companions, and retire to inform the first official that they meet.

17. The work of driving headways, winning, &c., should not be undertaken, excepting where descending ventilation is allowable, until after the crosscut of the return airway has been driven in an upper level.

18. In every fiery mine there must be continuous and efficient inspection of the air-current, both as a whole and in detail, and, if necessary, this should be done by persons specially appointed.

3.—USE OF EXPLOSIVES.

Complete Suppression of the Use of Explosives.—There is no doubt that in the presence of firedamp, and especially of coal dust combined, the use of explosives constitutes a serious danger, and that if shot-firing were strictly prohibited it would prevent many cases of explosions; but such a course is open to many technical and economical objections.

From a technical point of view it must be recognized that in the majority of coal districts there is a certain abuse of explosives in the sense that in the working, properly speaking, of the coal, as well as in easily exploited coal seams, the use of explosives has replaced the ordinary use of the pick. It is evident that in a great number of cases it would be very desirable, even as regards the exploitation, to considerably limit the use of explosives, and moreover this could be done without any great difficulty. But it is otherwise with the prohibition of the use of explosives in the main, because then, besides the exploitation, it would affect the processes of driving headways, mining, &c., in the rock as well as in the coal. To renounce altogether the violent mechanical action of explosives would naturally necessitate a much greater amount of hard labour, and would doubtless result in a much greater total of accidents; in certain circumstances it is probable the number might surpass the total of fatal accidents caused by explosives and explosions of fire damp. Also, winning and driving headways in very hard coal or rock without the aid of explosives would require much longer time, which would also be a new source of danger, and would be still further augmented by the fact that the miner would be exposed to the danger of fallings in, slips, &c.,

whereas with the aid of explosives the rock or coal is brought down in his absence.

If the prohibition of explosives were exclusively limited to working the coal in the seam, as was at first proposed by the Scientific Technical Committee of the Commission, yet a measure of this sort would be useless, because the working in the coal and in the stone is so frequently mixed together that a distinction is hardly possible. Besides, it is not unusual for explosions of fire damp and coal dust to take place when working in the rock, and, in any case, this would not ensure absolute safety. To these technical considerations must also be added important considerations from an economical point of view, and first of all would be the increased cost of working which would inevitably result from such a measure. At the conclusion of many comparative trials, made with this object in view, there was reason to fear that the total prohibition of the use of explosives in fiery mines would not only render unexploitable numerous beds which are now being worked, but that also in many mines which are productive at the present time it would have been equivalent to the total prohibition of the whole of the workings. Also, the interdiction of explosives would lead to important differences in the conditions of competition, because it would affect different coal districts, and even the various mines in each of them, very unequally.

In the presence of these difficulties the absolute prohibition of the use of explosives in coal mines must only be considered as an extreme measure, undertaken in order to ensure the safety of mines extraordinarily dangerous, and consequently the majority of the Commission resolved not to recommend such a general measure. And in arriving at such a conclusion the Commission was guided by a fresh consideration—namely, that independently of limiting the use of explosives as much as possible, the danger of explosives, as was demonstrated at the Neunkirchen experiments, may be greatly diminished, even if not entirely removed, by abolishing the use of gunpowder, and replacing it, using certain special methods of precaution, by explosives of rapid combustion, or explosives of great rending force.

In comparison with what are termed “Fiery” Mines here it is interesting to note that the Russian Commission classifies a mine as “fiery” when fire damp has made its appearance in it within two years.

Under the provisions of the section amending the explosives clause, the following gentlemen were associated with the inspector with a view of finding what explosives could be considered safe to use instead of gunpowder:—Henry Rae, Springhill; Thos. Johnston, Westville; H. S. Poole, Stellarton; R. H. Brown, Sydney Mines; Robert Crosby, Cow Bay.

Several meetings were held at Stellarton, and experiments made by the Commission and by a Committee in Cape Breton and Pictou County mines.

The general value of the explosives tested before the Commission at Stellarton in September, 1891, may be gathered from the following selection of experiments conducted under the supervision of members of the Commission :

Two parties submitted explosives. The Acadia Powder Company of Halifax submitted two grades of a dynamite explosive, rendered, it was claimed, less local in its action and flameless by the addition of certain chemicals. As their explosive was experimental its composition was not considered at the outset. The local branch of the English Roburite Company submitted roburite as manufactured by them in Halifax, giving its composition as 18 per cent. of chlorodi nitro benzol and 82 per cent. of nitrate of ammonia. It may be remarked here that the Secretary of the English company intimated later that the compound as manufactured there did not contain over $12\frac{1}{2}$ per cent. of chlorodi nitro benzol, and that presumably it was made in Halifax of the same strength. The Commission, up to the date of its preliminary report, has dealt with the question of composition only in a general manner.

It may be remarked that in all the experiments the shots were fired with detonators ignited by a Victor battery.

1st Experiment.—Two 6 oz. cartridges of roburite were placed on the ground six feet apart on the same wire, and covered with a few shovels full of dry slack coal. Both shots gave a flash.

2nd Experiment.—One 6 oz. cartridge of grade "B," and a 3 oz. cartridge of grade "C" of the explosives of the Acadia Company, were connected to the same wire, placed on the ground as before and covered with slack. On firing there was a flash from grade "C" cartridge, but none from grade "B" cartridge.

3rd Experiment.—A 4 oz. cartridge of roburite covered with four inches of slack coal gave a flash on being fired.

4th Experiment.—A 4 oz. cartridge of grade "B" explosive of the Acadia Company, covered with four inches of slack, gave no flash on being fired.

The experiments were made on a dark night, in a space shaded by trees, and under conditions as far as possible similar.

These experiments were continued in the McGregor pit of the Acadia Coal Company. A number of holes were bored in the high side of a level in firm coal, in a five foot seam, about half way between the roof and floor. The holes were 3 feet 6 inches deep and from $1\frac{1}{2}$ to $1\frac{3}{4}$ inches in diameter.

1st Experiment.—Charge 7 oz. explosive "B," hole tamped with clay for 25 inches. Shot blew the outside tamping off for a depth of 18 inches. No light visible.

2nd Experiment.—Charge 4 oz. roburite. Hole tamped with clay for 20 inches. Shot blew out tamping. No light visible.

3rd Experiment.—Charge 4 oz. explosive "B." Hole tamped with clay for 20 inches. Shot blew out tamping. No light visible.

4th Experiment.—Charge 7 oz. explosive “B.” No tamping. Shot gave bright flash.

5th Experiment.—Detonator of Acadia Powder Company fired outside the hole alone and uncovered, gave flash.

6th Experiment.—A four ounce cartridge, explosive “B,” with detonator in rear of cartridge and pushed into back of hole, gave slight flash on being fired.

In the opinion of those witnessing these experiments the flash observed when the explosives were fired without tamping was not greater than that due to the detonator, except, perhaps, in the case of the fourth experiment in the McGregor pit. It is probable that the greater or less amount of flash observable in a number of experiments may be due either to a lack of uniformity of the explosive mixture, or to the detonators not in each case occupying the same position in the cartridge. The fact has been elicited during the observations of the Commission that the explosives fired unconfined did not give a flame, but a very brief flash of light. The blown out shots did not flame nor did they give a light, a very slight tamping being apparently enough to delay the progress of the explosion long enough for the flash to have disappeared when rupture of the enclosing matter took place.

A number of experiments were made in this pit substituting the new explosives for gunpowder in the ordinary working of the coal. These showed that the work could be performed as readily with them as with gunpowder after the miners understood its strength and the proper way to handle it. I may mention here that roburite has for some time replaced gunpowder in the adjoining Intercolonial Colliery, and is reported as doing the work equally well and at lessened cost per ton. One example only of these experiments in the regular working places of the McGregor Colliery will be given, as it will serve to show the nature of the rest.

Working place 15 feet wide. Bench 6 feet by 7 feet by 3 feet 9 inches high. Hole 5 feet deep, 2 feet 6 inches from the high side, level, and on bottom of seam. Charge 18 oz. “B” explosive. First half of hole stemmed with clay, rest with slack coal. The shot was satisfactory. Coal hard and compact, and the bench had a layer of stone on top about 9 inches thick.

A sub-committee, together with agents of the manufacturers of explosives, visited Cape Breton and experimented with the explosives before the Commission in most of the mines. The tests were the subject of much interest to managers and men, and seemed to demonstrate that after a little experience it could readily replace gunpowder.

The Committee concluded their report in the following words:—

“At some of the mines we found an existing prejudice against the introduction of any new explosive. The experiments convince us that in either roburite or flameless powder we have explosives practically flameless, and therefore, that can be used with comparative safety where powder cannot be used except at a certain risk. In no

single instance, and there was every kind of shot, did any one notice flame. A great point with some of the miners is the cost. Roburite in small shots may be rendered more expensive than powder on account of the caps. The agent for the flameless powder asserts that explosives can be made of any strength, and at a cost very little higher than powder. It may be difficult to find an explosive that will satisfy the workmen, or do equally as well as powder, yet we are convinced that with a little experience and patient tests, either of the explosives we tried will be excellent substitutes for powder, with this tremendous advantage that they are much safer to use in all cases, and more especially in fiery mines."

The sittings of the Commission were renewed at Stellarton on December 15th. Further evidence was taken, and correspondence submitted which had taken place between the Inspector of Mines and various manufacturers of explosives. Samples of Ammonite, an explosive already referred to, had been forwarded from England, and tested in the Sydney mines, Cape Breton county, with results not altogether satisfactory, but not discouraging when the want of experience is taken into consideration.

It was agreed that the following preliminary report be submitted to the Government:—

STELLARTON, December 16th, 1891.

To the Honorable the Lieutenant-Governor in Council:

SIR,—We, the undersigned, associated with the Inspector of Mines, under the provisions of the Mines Regulation Act, Chapter 8, Revised Statutes, Fifth Series, as amended, section 25, sub-section 7, par. (e) viz:—

Provided, however, if at any time the Inspector of Mines, together with any persons experienced in the composition or use of explosives, who he may associate with himself for the purpose, shall report that any explosive is free from danger, the Lieutenant-Governor may, by Order-in-Council, determine that the restrictions of sub-section (d) of this section shall not apply to such explosive, and in such case, such explosive may be used so long as said Order-in-Council remains in force."

beg respectfully to make the following preliminary recommendations as to the freedom from danger of certain detonating explosives which have been submitted to us, and incorporate therewith some recommendations calculated in our opinion to tend to greater safety in the use of such explosives.

We presume that the sub-section under which we are appointed is qualified in the same manner as the remainder of the General Rules collected under section 25 of the Mines Regulation Act, by the prefix to said section, viz., "so far as is reasonably practicable."

We have examined witnesses, and have experimented with various detonating explosives in the Pictou Collieries, and a committee has also experimented with detonating explosives in several of the Cape Breton mines. This testimony and reports are herewith submitted.

We have selected out of the detonating explosives submitted two which are apparently safe, and adapted for coal mining in this province. In this connection it may be remarked that the enquiry has been confined solely to the question of safety in blasting, that no enquiry has been made into the question of cost, or of safety in manufacture, transportation, or storage. No opportunity has yet been afforded for ascertaining the composition of these two detonating explosives, pending the investigation of certain changes in the mixtures calculated to increase their safety.

It is recommended that no detonating explosive be allowed to be used in coal mines without a license first obtained from the Commissioner of Mines, authorized thereto by an Order-in-Council.

That the four explosives approved by the French Minister of Public Works, August 1st, 1890, be allowed to be used subject to the regulations herein recommended. These are :—

1. Mixtures of Dynamite No. 1 (75 per cent. of nitro-glycerine and 25 per cent. of silica) and nitrate of ammonia, in which the proportion of dynamite should not exceed 40 per cent. for stone work, and 20 per cent. for coal getting ;

2. Mixtures of blasting-gelatine (91.7 per cent. of nitro-glycerine, and 6.3 per cent. of nonnitric cotton), and nitrate of ammonia, in which the proportion of blasting-gelatine should not exceed 30 per cent. for stone work, and 12 per cent. for coal getting ;

3. Mixtures of octonitric cotton with nitrate of ammonia, in which the per centage of gun cotton does not exceed 20 per cent. for stone work, and 9.5 per cent. for coal getting ;

4. Mixtures of dinitro-benzol and nitrate of ammonia, in which the proportion of dinitro-benzol does not exceed 10 per cent. for stone work.

That any other detonating explosive fulfilling the following conditions may be licensed :—

- 1st. The products of its detonation should not contain any combustible matter, such as nitrogen, carbon monoxide, solid carbon, etc.

- 2nd. Its temperature of detonation as calculated by the formulæ, adopted by the French Commission referred to, should not exceed 1900 degrees C. for explosives used in stone work, nor 1500 degrees C. for those employed in coal blasting.

It is recommended that in all cases the tamping should exceed 20 inches in length, that in the case of blasting in stone the tamping should be of a plastic material, but at present we are not prepared to make any recommendation as to the material to be used in tamping shots fired in coal. Any manufacturer desirous of introducing into the coal mines an explosive, shall file with his application for license a statement giving full particulars of the composition of the explosive ; this statement not necessarily for publication.

The Inspector, or any person authorised by the Commissioner of Public Works and Mines, shall have power to take from the maker,

vendor, or consumer, samples of any licensed explosive, and should such explosive prove to differ from its registered composition, or not to fulfill the requirements recommended by the Commission, the license therefor granted by the Commissioner may, upon his report, be cancelled or suspended by the Lieutenant Governor-in-Council.

It is recommended that all explosives be fired by electrical fuse by low tension electricity.

It is recommended that the use of high explosives be permitted, where tamping by water can be used in the proportion by bulk of four per cent. of water to one of explosive.

While pleased with the practical results with roburite as seen by us, we find that it contains nearly ten per cent. of nitrate of ammonia less than the French Minister of Public Works allows in his decree of August 1st, 1890, as a safe proportion for roburite to be used in stone blasting (no reference being made by him to the included chlorine), and recommend, in view of the satisfaction hitherto attending the use of this 18 per cent. roburite in Nova Scotia, that its use be allowed for four months under the regulations herein contained, in order that the manufacturers may be enabled to produce a material approaching more closely in composition that recommended by this Commission. A similar recommendation is made in the case of the so-called "Flameless Explosive" of the Acadia Powder Co.

We wish it to be understood that we do not consider that the use of detonating explosives should in any way lessen the necessity for the observance of the customary regulations respecting the firing of charges in the presence of gas, examination of contiguous places, etc.

All of which is most respectfully submitted for your Honor's consideration.

The Commission adjourned.

Since the presentation of this preliminary report, experiments are being carried on with ammonite. The behaviour of roburite in the Pictou Collieries is being carefully studied. The Acadia Powder Company have secured patents for Canada, and are experimenting with a mixture having dynamite for its base so prepared that it is hoped that dampness will have no injurious effect on the explosive when prepared for use in cartridges.

The Acadia "explosive," at present substituted for the grade "A" and "B" explosives already referred to, is simpler in composition. At present it is guaranteed to contain less than twenty per cent. of dynamite, and to come within the limit laid down by the French government. The "watering" ingredient is nitrate of ammonia with the addition of a chemical, which stable in itself, is calculated to neutralize any trace of acid that may be present. So soon as these experiments, and the study of the practical behaviour of the explosives is finished, the Commission hope to be able to recommend to the Government two safe explosives capable of replacing gunpowder, and not excessive in cost.

IRON MINING.

The past season has exhibited a general increased interest in iron smelting, etc. The Londonderry Iron Company have rebuilt one of their furnaces and raised it to a height of seventy-five feet instead of sixty-three, as originally built. Two new kilns for roasting the Spathic ores found so abundantly on the company's property, and having a capacity of 100 tons daily, have been erected.

The New Glasgow Iron, Coal & Railway Company expect to have their furnace in blast next June. Their railway to Bridgeville is about completed, and their development work secures them an abundant supply of good ore. The furnace is 65 feet high; bosh 25 feet 6 inches; hearth 9 feet 9 inches. Three hot blast stoves. Two blowing engines of 1,000 horse power each. Capacity, 15,000 feet of air per minute. Anticipated yield, 100 tons per day. The coke ovens are of the Coppee pattern, and are likely to be the first of their pattern to go into operation in America. Capacity of each oven about 6 tons, making 70 to 80 tons of coke per day. The coke is all to be crushed and washed before coking, and the ash reduced to about 4 or 5 per cent. in the coal.

The Pictou Charcoal Iron Company have located themselves at Bridgeville, on the line of the New Glasgow Company's Railway, and the object of their work may be gathered from the following remarks of Mr. E. J. Spostedt, Mines Manager:—

“Our object is to establish a charcoal iron plant here at Bridgeville, and to use the brown ores principally, and to produce a charcoal iron specially adapted for car wheel making, and also for especially strong machine castings. With this object in view we have purchased mining rights of iron ore, limestone and manganese ore, and some six thousand (6000) acres of hardwood land. The size of our furnace will be 11 feet bosh, and 50 feet in height, and the estimated output for the first few years, five thousand (5,000) tons per annum.”

The following memorandum of the operations at Torbrook will be of interest, as marking the commencement of a mining industry in Annapolis County, which promises to be valuable and permanent:—

“About the beginning of March last active operations were first commenced at Torbrook, Annapolis County, on the bed of red hematite ore, discovered there during the previous year. The ore extends along the base of the South Mountain, the strike being about N. 60° E., and has been traced on the surface from Nictaux Falls eastwards to the Kings County line, a distance of 4 miles. The bed has an average thickness of 5½ feet clear ore, and is so tilted up as to dip at an angle varying from 70 to 80 degrees. Both the hanging and foot walls are of a variegated talcose state, very light in color and between eighteen to twenty-four inches thick. These walls form a fairly good support for the time being, although slightly soft. The country rock is of a dark bluish state, probably of upper Devonian age. A fair sample of the ore yields about 60 per cent. metallic iron; silica, 9 to

10 per cent.; lime, 4 to 5 per cent; phosphoric acid, 0.3 per cent.; sulphur, trace.

When decided operations were first entered upon, a shaft was sunk in the ore 80 feet deep, levels driven east and west, and the ore taken out by back stoping. Inside of a month another shaft was sunk, about 350 feet from the first, and the ore mined by underhand stoping. A hoisting engine was soon got into position, and ore raised at the rate of 25 tons daily. In the spring a survey was made, and in the summer a railroad constructed from Wilmot station to the mines at Torbrook, a distance of 3 miles. The track runs alongside of the shafts. The cars being loaded from chutes. Since the construction of this branch line, two new shafts have been put down, and new hoisting gear has replaced the old. At present we have in operation one four drum hoist, and one single drum hoist. Three small pumps are required to free the mine from water. Steam is supplied to engines and pumps from three boilers. Some slight difficulty has been experienced with faults; but these seem to grow smaller as the depth increases. Some having already disappeared even at the comparatively slight depth of the present workings.

All the ore is shipped via Windsor Junction to Londonderry. Last month (January), 105 cars were loaded at Torbrook, in all about 1,650 tons."

IRON ORE.

The following figures show the production of iron ore during the year:—

	Tons.
Pictou Charcoal Iron Co., Bridgeville, Pictou Co.	681
Londonderry Iron Co., Londonderry, Col. Co.	46,350
Ore from Springville Pictou Co.	113
" Bridgeville " 	680
" Pugwash, Cumberland Co.	214
" Torbrooke, Annapolis Co.	7,273
New Glasgow I. C. & Ry. Co., Springville, Pictou Co.	2,000
Total	57,311

COPPER.

There is little new to report. A lease to work Copper ore at Brierly Brook was applied for by B. G. Gray and J. A. Grant.

At Coxheath a good deal of work was done. The following will give an idea of the increased value shown by last season's operations at this important mine:—

"The principal mining development at the Coxheath mine during the year has been the sinking of No. 2 shaft to the 320 feet level; at

that depth a cross-cut was driven to the north, which cut the "B" vein at 89 feet from the centre of the shaft, which is about the same distance from the shaft at which this vein was encountered in the 250 feet level; the hanging wall was cut at 141 feet from the shaft. The main ore body in the vein is about 17 feet in width, and the ore averages in quality fully as high grade as in the upper levels; low grade ore is scattered throughout the remainder of the vein on this level, and the outlook is certainly encouraging for values entirely out of the usual order. The company intend to sink this shaft to the 400 feet level before hoisting ore for market.

On the New Mountain vein, No. 3 shaft was sunk to its first level at 100 feet, but the vein was not driven upon when operations closed for the season. This vein is of great promise, and several other explorative pits were sunk on it at various points, with good results; and the surface work has located the point of junction of this vein with vein "B" at a location about 1700 feet easterly from No. 3 shaft, and 1300 feet easterly from No. 2 shaft.

A new residence has been erected for the mining captain and staff, and a grade crossing of the Cape Breton railway been granted by the Dominion authorities.

On the Argyle area work was confined to additional surface prospect work. In August the mine was visited and reported upon by Geo. Grant Francis, M. E., of London, and Mr. Walter Ingalls of the staff of the "New York Engineering and Mining Journal;" at that time it was estimated that the ore on the dumps amounted to about 3000 tons, with a total amount of ore in sight of 42,732 tons; since then the cutting of B. vein on the 320 feet level has increased the ore in sight to about 50,000 tons.

The following is the labor return for 1891:

Skilled labor, underground.....	5,941 days.
Unskilled " "	3,867 "
Skilled " overground.....	2,930 "
Unskilled " "	4,492 "
Coal teamster, &c.....	1,249 "

Total..... 18,679 days."

During the year Mr. Peters visited the mine and perfected plans for concentrating and smelting works. As usual the work at the mine has been lessened during the winter, but it is hoped that in the spring the construction of the railway will be proceeded with.

GYPSUM.

The following figures show the amount of gypsum exported during the past year:

GYPSUM EXPORTS, 1891.

	Tons.	Value.
Halifax	1,200.....	\$ 1312
Baddeck	16,000.....	.....
Windsor	118,969.....	116,479
Cheverie	17,330.....	13,433
Walton	7,125.....	7,001
Arichat	510.....	510
Mabou.....	800... ..	.....
<hr/>		
Total.....	161,934 .....	.....

The Mabou Gypsum Company report that they have opened up two new quarries; extended old wharf; erected new wharf; quarried about 7000 tons rock; erected new steam mill, 35' x 60'; ground about 500 tons.

MANGANESE.

Mr. J. W. Stephens took out a few tons from his Tenny Cape mine. A few tons were shipped from the Onslow mine; and Mr. E. T. Moseley of Sydney, reported having shipped 28 casks of 90 per cent. ore on St. Peters. It is anticipated that a larger output will be made during the year 1892.

I have the honor to remain, yours obediently,

E. GILPIN, JR.,

Inspector of Mines.

TABLE A.—COAL TRADE BY COUNTIES.

	CUMBERLAND.		PICTOU.		CAPE BRETON.		OTHER COUNTIES.		TOTAL.	
	Raised.	Sold.	Raised.	Sold.	Raised.	Sold.	Raised.	Sold.	Raised.	Sold.
1st Quarter.....	121,425	109,071	106,230	85,006	131,574	26,581	.....	.....	359,229	220,658
2nd "	132,843	116,810	112,776	99,652	318,132	267,707	156	150	563,907	484,319
3rd "	127,537	110,600	115,337	115,699	409,494	483,171	.....	.....	652,368	709,470
4th "	140,173	125,786	113,826	104,739	215,121	204,933	160	40	469,280	435,498
Total	521,978	462,267	448,169	405,096	1,074,321	982,392	316	190	2,044,784	1,849,945
1890.....	490,149	438,608	475,625	430,509	1,018,227	916,994	.....	.....	1,984,001	1,786,111

TABLE B.—COAL TRADE BY COUNTIES.

	CUMBERLAND.			PICTOU.			CAPE BRETON.			OTHER COUNTIES.		TOTALS.			GRAND TOTAL.
	Round.	Slack.	Run of Mine.	Round.	Slack.	Run of Mine.	Round.	Slack.	Run of Mine.	Round.	Slack.	Round.	Slack.	Run of Mine.	
NOVA SCOTIA :															
Land Sales....	60,492	44,041	11,199	121,858	104,751	...	9,210	9,001	.....	190	.....	191,750	157,793	11,199	360,742
Sea Borne.....	56	368	.....	32,948	5,541	.....	185,435	32,901	21,746	.....	.....	218,439	38,810	21,746	278,995
Nova Scotia Total..	60,548	44,409	11,199	154,806	110,292	.....	194,645	41,902	21,746	190	.....	410,189	196,603	32,945	639,737
New Brunswick ..	91,788	23,540	38,065	24,314	7,603	.....	41,528	2,477	.....	.....	.....	157,630	33,620	38,065	229,315
Newfoundland ....	.....	.....	.....	1,636	46	.....	101,837	4,167	931	.....	.....	103,473	4,213	931	108,617
P. E. Island .....	.....	.....	.....	18,458	24,452	.....	10,105	13,959	499	.....	.....	28,563	38,411	499	67,473
Quebec	53,508	19,756	110,309	59,771	3,548	.....	426,260	95,957	6,177	.....	.....	539,539	119,261	116,486	775,286
West Indies .....	.....	.....	.....	.....	.....	.....	4,086	.....	.....	.....	.....	4,086	.....	.....	4,086
United States .....	.....	9,087	58	.....	170	.....	2,585	13,531	.....	.....	.....	2,585	22,788	58	25,431
Total.....	205,844	96,792	159,631	258,985	146,111	.....	781,046	171,993	29,353	190	.....	1,246,065	414,896	188,984	1,849,945

MINES REPORT.

C

COAL.—SALES.

NAMES.	1st Quarter.	2nd Quarter.	3rd Quarter.	4th Quarter.	Year 1891.	Year 1890.
Nova Scotia:						
Land Sales....	91,478	85,365	77,732	106,167	360,742	348,502
Sea Borne	15,905	62,880	108,246	91,964	278,995	253,454
N. S. Total	107,383	148,245	185,978	198,131	639,737	601,956
New Brunswick..	40,215	48,198	77,399	63,503	229,315	224,776
Newfoundland ..	6,194	23,315	39,552	39,556	108,617	96,033
P. E. Island.....	.....	15,714	32,930	18,829	67,473	55,843
Quebec	64,806	239,062	360,695	110,723	775,286	751,931
West Indies .....	.....	855	2,495	736	4,086	4,718
United States....	2,060	8,930	10,421	4,020	25,431	50,854
Other Countries..	.....	.....	.....	.....	.....	.....
Total	220,658	484,319	709,470	435,498	1,849,945	1,786,111
1890	213,629	472,291	604,858	495,333	1,786,111	.....

COAL.—GENERAL STATEMENT.

1891.	Produce.	Sold.	Colliery Consumption.
1st Quarter.....	359,229	220,658	36,950
2nd "	563,907	484,319	51,755
3rd "	652,368	709,470	46,256
4th "	469,280	435,498	40,022
Total	2,044,784	1,849,945	174,983
1890	1,984,001	1,786,111	161,240

COAL PRODUCE OF NOVA SCOTIA DURING THE YEAR 1891.

COLLIERY.	Raised.	SOLD.			Total Sold.	COLLIERY CONSUMPTION.	
		Round.	Slack.	Run of Mine.		Engines.	Workmen.
CUMBERLAND Co.							
Chignecto	960	400	380	.....	780	20	130
Joiggins	60,056	50,280	3,592	.....	53,872	3,830	2,06
Minudie	1,667	1,358	65	.....	1,423	30	.....
Springhill	459,395	153,806	92,755	159,631	406,192	29,327	9,990
Pictou Co.							
Acadia	286,372	155,621	93,492	.....	249,113	27,854	7,698
Black Diamond	18,144	12,113	5,658	.....	17,771	200	173
East River	2,925	2,125	.....	.....	2,125	670	130
Intercolonial	140,728	89,126	46,961	.....	136,087	7,645	2,656
CAPE BRETON Co.							
Bridgeport	30,897	30,328	2,219	.....	32,547	295	383
Caledonia	159,985	97,492	47,503	.....	144,995	2,050	1,465
Gardner	18,746	14,689	2,416	.....	17,105	730	268
Glace Bay	117,767	101,142	9,070	.....	110,212	6,350	556
Gowrie	158,064	123,214	29,153	.....	152,367	5,171	4,909
International	133,179	88,505	36,172	.....	124,677	5,672	2,807
Ontario	3,111	2,709	.....	.....	2,709	326	76
Reserve	170,844	134,306	20,350	.....	154,656	10,847	4,119
Sydney	170,691	130,682	15,963	.....	146,645	13,784	9,673
Victoria	111,037	57,979	9,147	29,353	96,479	9,250	3,719
INVERNESS Co.							
Broad Cove	156	150	.....	.....	150	.....	6
Rankin	160	40	.....	.....	40	80	15
Total.	2,044,784	1,246,065	414,896	188,984	1,849,945	124,131	50,852

E

COLLIERIES.

COLLIERIES.	UNDERGROUND.				ABOVE GROUND.				CONSTRUCTION.				TOTAL.		No. of tons per cutter.	Average quantity raised per day.	HORSES.		PITS WORKED.
	LABORERS.		Boys.	Days' Labor.	Skilled Labor.	LABORERS.	Boys.	Days' Labor.	Persons.	Days' Labor.	Above.	Below.							
	Skilled Labor.																		
<i>Cumberland Co.</i>																			
Chignecto	2	324	4	1112	3	8	.....	.....	.....	7	1436	.....	.....	480	17	55	.....	.....
Joggins	96	38597	19	11840	14	35	4	.....	.....	221	51758	.....	.....	625	265	226	9	.....
Springhill	532	263064	143	85993	113	185	40	.....	.....	1370	351182	.....	.....	863	1780	258	72	.....
Stanley	3	255	.....	270	2	.....	.....	.....	.....	8	525	.....	.....	.....	.....	.....	1	.....
<i>Pictou Co.</i>																			
Acadia	296	155295	82	80193	81	150	34	.....	.....	954	239614	.....	.....	961	1547	185	19	.....
Black Diamond	9	4811	3	2183	4	6	1	.....	.....	36	6994	.....	.....	2016	137	132	1	.....
East River	5	1437	.....	693	2	.....	.....	.....	.....	7	2130	.....	.....	585	11	252	.....	.....
Intercolonial	163	69189	47	32852	39	56	12	.....	.....	391	103780	.....	.....	863	574	245	10	.....
<i>Cape Breton Co.</i>																			
Bridgeport	24	11314	6	2744	2	5	.....	.....	.....	44	14600	.....	.....	1287	132	234	6	.....
Caledonia	102	55156	41	19507	25	50	10	.....	.....	338	78981	.....	.....	987	653	245	35	.....
Gardiner	50	10266	6	3185	2	.....	.....	.....	.....	87	16151	.....	.....	374	94	198	5	.....
Glace Bay	136	40358	17	8684	51	55	26	.....	.....	325	49042	.....	.....	865	518	227	32	.....
Gowrie	150	46028	23	34313	30	70	26	.....	.....	342	80341	.....	.....	1053	1663	95	25	.....
International	153	47111	38	38623	34	100	18	.....	.....	372	85754	.....	.....	870	686	194	33	.....
Ontario	9	1503	3	6512	2	.....	.....	.....	.....	22	8015	.....	.....	345	26	119	2	.....
Reserve	96	75951	26	39415	22	46	7	.....	.....	228	115607	.....	.....	1779	675	253	4	.....
Sydney	251	98197	110	53072	62	86	46	.....	.....	605	151269	.....	.....	680	687	247	8	.....
Victoria	132	54966	28	31828	10	75	21	.....	.....	352	86794	.....	.....	841	415	267	12	.....
<i>Inverness Co.</i>																			
Broad Cove	2	140	1	43	1	.....	.....	.....	.....	5	183	.....	.....	78	.....	186	.....	.....
Rankin	8	.....	.....	.....	.....	.....	.....	.....	.....	12	.....	.....	.....	20	.....	.....	.....	.....
<i>Richmond Co.</i>																			
Sea Coal	4	688	6	750	5	5	.....	.....	.....	20	1438	.....	.....	.....	.....	.....	.....	.....
	2283	1048	634	453812	502	944	248	.....	.....	5746	1341694	.....	.....	.....	.....	.....	106	332

COAL.

NOVA SCOTIA EXPORTED TO THE UNITED STATES.

Years.	Tons.	Duty.	Years.	Tons.	Duty.
1850	118,173	24 ad.	1871	165,431	\$1 25
1851	116,274	"	1872	154,092	75
1852	87,542	"	1873	264,760	"
1853	120,764	"	1874	138,336	"
1854	139,125	Free.	1875	89,746	"
1855	103,222	"	1876	71,634	"
1856	126,152	"	1877	118,216	"
1857	123,335	"	1878	88,495	"
1858	186,743	"	1879	51,641	"
1859	122,720	"	1880	123,423	"
1860	149,289	"	1881	113,728	"
1861	204,457	"	1882	99,302	"
1862	192,612	"	1883	102,755	"
1863	282,775	"	1884	64,515	"
1864	347,594	"	1885	34,483	"
1865	465,194	"	1886	66,003	"
1866	404,252	"	1887	73,892	"
1867	338,492	\$1 25	1888	30,198	"
1868	228,132	"	1889	29,986	"
1869	257,485	"	1890	50,854	"
1870	168,180	"	1891	25,431	"

NOTE.—The quantities given for the years 1852 to 1872 are on the authority of the Board of Trade, Philadelphia, and are probably under-estimated.

MINES REPORT.

G

Nova Scotia Coal Sales, from 1785 to 1891 (Inclusive.)

Year.	Sales.	Total.	Year.	Sales.	Total.
1785	1,668	14,439	1841	148,298	Forw'd 1,208,150
1786	2,000		1842	129,708	
1787	10,681		1843	105,161	
1788			1844	108,482	
1789			1845	150,674	
1790			1846	147,506	
1791	2,670		1847	201,650	
1792	2,143		1848	187,643	
1793	1,926		1849	174,592	
1794	4,405		1850	180,084	
1795	5,320	51,048	1851	153,499	1,533,798
1796	5,249		1852	188,076	
1797	6,039		1853	217,416	
1798	5,948		1854	234,812	
1799	8,947		1855	238,215	
1800	8,401		1856	253,492	
1801	5,775		1857	294,198	
1802	7,769		1858	226,725	
1803	6,601		1859	270,293	
1804	5,976		1860	322,593	
1805	10,130	70,442	1861	326,429	2,399,319
1806	4,938		1862	395,637	
1807	5,119		1863	429,351	
1808	6,616		1864	576,935	
1809	8,919		1865	635,586	
1810	8,609		1866	558,520	
1811	8,516		1867	471,185	
1812	9,570		1868	453,624	
1813	9,744		1869	511,795	
1814	9,866		1870	568,277	
1815	9,336	91,527	1871	596,418	4,927,339
1816	8,619		1872	785,914	
1817	9,284		1873	811,106	
1818	7,920		1874	749,127	
1819	8,692		1875	706,795	
1820	9,980		1876	634,207	
1821	11,388		1877	697,065	
1822	7,512		1878	693,511	
1823	27,000		1879	688,628	
1824			1880	954,659	
1825			1881	1,035,014	
1826			1882	1,250,179	
1827	12,600	1883	1,297,523	7,317,430	
1828	12,149	1884	1,261,650		
1829	20,967	1885	1,254,510		
1830	21,935	1886	1,373,666		
1831	27,269	1887	1,519,684		
1832	37,170	1888	1,576,692		
1833	50,369	1889	1,555,107		
1834	64,743	1890	1,786,111		
1835	50,813	140,820	1891		1,849,945
1836	56,434		Total.....		33,146,117
1837	107,593				
1838	118,942				
1839	106,730				
1840	145,962				
	101,198				
	839,954				

SUMMARY.

1785 to 1790	14,349	1841 to 1850	1,533,798
1791 to 1800	51,048	1851 to 1860	2,399,319
1801 to 1810	70,452	1861 to 1870	4,927,339
1811 to 1820	91,527	1871 to 1880	7,317,430
1821 to 1830	140,820	1881 to 1890	13,910,136
1831 to 1840	839,954		

GOLD—GENERAL STATEMENT FOR YEAR 1891.

DISTRICT.	No. of Mines.	Days' Labor.	Mills.	Tons Crushed.	Yield of Gold per Ton.			Total Yield of Gold.		
					Oz.	Dwts.	Grs.	Oz.	Dwt.	Gr.
Tangier	2	3316	1	42	0	6	6	13	3	12
Whiteburn	1	5751	2	803	1	0	6	813	12	2
Central Rawdon	1	4404	1	510	0	1	8	342	0	0
Killag	1	5375	1	379	0	18	11	354	6	16
Oldham	2	15085	2	2019	1	9	0	2909	10	13
Caribou }	3	14426	4	5489	0	5	1	1486	14	21
Moose River }										
Wine Harbour	1	5595	1	1823	0	7	15	698	9	0
Waverley	3	11065	3	1611	0	7	11	602	4	0
Lake Catcha	1	7228	1	2432	0	6	13	800	3	0
Fifteen Mile Stream	2	18522	2	4562	0	12	16	2396	10	12
Uniacke	3	10154	4	1751	1	13	20	2965	5	4
Montagne	2	5728	3	863	1	11	10	1361	1	0
Stormont	2	9651	4	829	1	3	2	957	3	4
Malaga	2	17520	2	4826	0	19	12	4664	13	17
Salmon River	1	10580	1	5210	0	5	9	1406	0	0
Sherbrooke	4	2537	2	464	0	5	3	119	5	0
Unproclaimed, etc.	3	2444	5	1399	0	5	3	361	0	4
	34	149381	35212	22251	2	9

MINES REPORT.

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MONTHLY STATEMENT FROM EACH GOLD DISTRICT.

MONTH.	CENTRAL RAWDON.							KILLAG.						
	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Yield of Gold.			No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Yield of Gold.		
					Oz.	Dwts.	Grs.					Oz.	Dwts.	Grs.
January.....	1	746	29	75	54	0	0	1	647	25	8	11	18	2
February.....	1	838	33	130	154	0	0	1	416	16	7	7	18	10
March.....	1	291	11	60	111	0	0	1	420	16	20	22	17	13
April.....	1	37	1	.....	.....	.....	.....	1	510	20	40	34	19	15
May.....	1	710	28	.....	.....	.....	.....	1	497	19	42	37	16	0
June.....	1	991	39	245	23	0	0	1	629	25	37	39	2	0
July.....	1	270	10					1	758	30	30	34	5	0
August.....	1	246	9	.....	.....	.....	.....	1	735	29	70	59	18	0
September.....	1	274	10	.....	.....	.....	.....	1	763	30	75	46	17	0
October.....	1	.....	.....	.....	.....	.....	.....	1	.....	.....	50	58	15	0
November.....	1	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....
December.....	1	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....
Total.....	1	4404	.....	510	342	0	0	1	5375	.....	379	354	6	16

MINES REPORT.

MONTHLY STATEMENT FROM EACH GOLD DISTRICT.—Continued.

MONTH.	OLDHAM.					CARIBOU AND MOOSE RIVER.								
	No. of Mine.	Days' Labor.	No. of Men.	Tons Crushed.	Yield of Gold.			No. of Mine.	Days' Labor.	No. of Men.	Tons Crushed.	Yield of Gold.		
					Oz.	Dwts.	Grs.					Oz.	Dwts.	Grs.
January	1	1412	56	139	106	1	0	3	1140	45	62	78	0	0
February	1	1233	49	135	786	10	0	3	1142	45	181	155	9	12
March	1	1302	52	69	174	14	0	3	1196	47	285	148	6	9
April	1	1214	48	27	1	0	0	3	1348	53	529	168	19	3
May	1	1132	45	32	2	12	11	3	1559	62	488	146	14	12
June	1	1202	48	.....	0	3	16	3	1470	58	674	137	4	12
July	2	774	30	385	186	4	10	3	876	35	520	188	15	21
August	2	1410	56	4	15	6	0	3	810	32	634	178	12	12
September	2	1476	59	14	23	11	0	3	896	35	802	127	11	15
October	2	1299	53	423	1316	9	0	3	1387	55	723	51	3	12
November	2	1313	53	472	183	15	0	3	1345	53	101	26	8	9
December	2	1318	52	319	113	4	0	3	1256	50	490	79	9	0
Total	2	15085	2019	2909	10	13	3	14426	5489	1486	14	21

MINES REPORT.

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MONTHLY STATEMENT FROM EACH GOLD DISTRICT.—Continued.

MONTH.	LAKE CATCHA.						FIFTEEN MILE STREAM.							
	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Yield of Gold.			No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Yield of Gold.		
					Oz.	Dwts.	Grs.					Oz.	Dwts.	Grs.
January.....	1	572	22	.....	.....	.....	.....	2	1321	52	360	227	0	0
February.....	1	785	31	233	25	0	0	2	1339	53	358	232	0	0
March.....	1	781	31	299	58	5	0	2	1504	60	471	271	18	0
April.....	1	837	33	301	63	0	0	2	1772	90	555	227	18	0
May.....	1	922	36	378	88	15	0	2	1836	93	515	242	10	0
June.....	1	917	36	290	90	8	0	2	1796	91	521	244	2	0
July.....	1	765	30	317	111	13	0	2	1643	65	375	248	5	0
August.....	1	623	25	168	72	17	0	2	1551	61	350	163	15	0
September.....	1	.....	.....	251	132	15	0	1	1557	62	330	184	0	0
October.....	1	338	13	75	56	0	0	1	1554	62	350	180	0	0
November.....	1	337	13	70	53	0	0	2	1336	53	377	175	2	12
December.....	1	351	14	50	48	10	0	1	1313	52	.....	.....	.....	.....
Totals.....	1	7228	.....	2432	800	3	0	.....	18522	.....	4562	2396	10	12

MINES REPORT.

MONTHLY STATEMENT FROM EACH GOLD DISTRICT.—Continued.

MONTH.	MALAGA.						SALMON RIVER.							
	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Yield of Gold.			No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Yield of Gold.		
					Oz.	Dwts.	Grs.					Oz.	Dwts.	Grs.
January.....	2	1465	58	570	354	5	17	1	1355	54	.....	73	0	0
February.....	2	1699	69	426	264	11	0	1	1157	46	350	285	0	0
March.....	2	3066	122	538	351	3	0	1	1408	56	500	88	10	0
April.....	2	448	19	414	360	18	0	1	1338	53	500	90	0	0
May.....	2	443	19	477	450	8	0	1	1362	54	450	104	0	0
June.....	2	437	19	481	369	3	0	1	1431	59	460	101	10	0
July.....	2	1933	99	438	558	11	0	1	.....	.....	600	122	0	0
August.....	2	1933	99	424	504	6	0	1	.....	.....	550	116	0	0
September.....	2	2040	81	431	468	4	0	1	.....	.....	.....	.....	.....	.....
October.....	1	1632	65	403	583	14	0	1	366	14	600	159	0	0
November.....	1	1216	48	110	216	5	0	1	526	21	700	151	0	0
December.....	1	1208	48	114	173	0	0	1	1637	65	500	117	0	0
Total.....	2	17520	4826	4464	13	17	1	10580	5210	1406	0	0

MINES REPORT.

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MONTHLY STATEMENT FROM EACH GOLD DISTRICT.—Continued.

MONTH.	TANGIER AND MOOSELANDS.					WHITEBURN.								
	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Yield of Gold.			No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Yield of Gold.		
					Oz.	Dwts.	Grs.					Oz.	Dwts.	Grs.
January.....	3	697	27	42	13	3	12	2	1026	41	110	107	10	22
February.....	3	598	23	.....	.....	.....	.....	2	991	39	118	125	10	4
March.....	3	570	22	.....	.....	.....	.....	2	879	35	155	151	6	0
April.....	3	221	8	.....	.....	.....	.....	1	876	35	91	90	7	0
May.....	3	143	5	.....	.....	.....	.....	1	894	35	119	121	4	13
June.....	3	322	12	.....	.....	.....	.....	1	746	29	101	101	3	11
July.....	2	234	9	.....	.....	.....	.....	1	127	5	49	51	10	0
August.....	2	216	8	.....	.....	.....	.....	1	174	6	.....	.....	.....	.....
September.....	2	315	12	.....	.....	.....	.....	1	38	1	63	65	0	0
October.....	1	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....
November.....	1	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....
December.....	1	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....
Totals.....	3	3316	.....	42	13	3	12	1	5751	.....	803	813	12	2

MONTHLY STATEMENT FROM GOLD FOR EACH DISTRICT. — *Continued.*

MONTH.	UNIACKE.					MONTAGUE.								
	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Yield of Gold.			No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Yield of Gold.		
					Oz.	Dwts.	Grs.					Oz.	Dwts.	Grs.
January.....	3	1260	50	203	148	12	6	2	133	5	82	131	8	0
February.....	3	1161	46	194	80	15	0	2	271	10	52	87	19	0
March.....	3	1310	52	178	88	0	15	2	275	10	93	145	8	0
April.....	3	605	24	109	333	7	0	2	901	36	93	136	5	0
May.....	3	808	32	215	187	39	0	2	908	36	113	181	6	0
June.....	3	888	35	252	188	5	0	2	1060	42	92	151	3	0
July.....	3	616	24	147	275	11	0	2	987	39	94	125	10	0
August.....	3	653	26	50	257	4	0	2	503	20	8	11	19	0
September.....	3	774	30	84	357	19	15	2	690	23	15	22	0	0
October.....	2	585	23	99	462	8	4	1	.....	.....	221	367	18	0
November.....	2	558	22	228	585	4	12	1	.....	.....	.....	.....	.....	.....
December.....	2	936	39	1
Totals.....	3	10154	1759	2965	5	4	2	5728	863	1361	1	0

MINES REPORT.

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MONTHLY STATEMENT FROM EACH GOLD DISTRICT.—Continued.

MONTH.	WINE HARBOR.						WAVERLEY						
	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Yield of Gold.			Days' Labor.	No. of Men.	Tons Crushed.	Yield of Gold.		
					Oz.	Dwts.	Grs.				Oz.	Dwts.	Grs.
January.....	1	1026	41	225	106	10	0	766	30	261	23	9	0
February.....	2	972	38	230	100	10	0	859	34	113	68	0	0
March.....	2	990	39	240	106	0	0	863	34	171	81	10	0
April.....	2	.....	.....	241	141	0	0	564	22	142	53	4	0
May.....	2	.....	.....	400	156	5	0	868	34	124	51	14	0
June.....	2	.....	.....		58	0	0	1022	40	66	31	0	0
July.....	1	1031	41	253	30	4	0	1477	59	196	66	0	0
August.....	1	934	33	234	.....	.....	.....	1106	44	61	57	10	0
September.....	1	642	25	.....	.....	.....	.....	905	36	132	25	5	0
October.....	1	.....	.....	.....	.....	.....	.....	1004	40	51	7	8	0
November.....	1	.....	.....	.....	.....	.....	.....	834	33	121	51	0	0
December.....	1	.....	.....	.....	.....	.....	.....	797	31	173	86	4	0
Total.....	1	5595	.....	1823	698	9	0	11065	.....	1611	602	4	0

MONTHLY STATEMENT FROM EACH GOLD DISTRICT. — *Continued.*

MONTH.	SHERBROOKE.						
	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Yield of Gold.		
					Oz.	Dwts.	Grs.
January	5	.....	0	65	13	0	0
February	5	203	8	.....	28	1	0
March	3	228	9	83	5	10	0
April .....	.....	.....	.....	36	16	1	0
May	3	514	20	47	7	0	0
June	3	.....	.....	42	5	8	0
July	3	451	18	35	16	5	0
August	3	458	18	39	5	0	0
September	3	683	27	32	2	7	0
October .....	.....	.....	.....	13	3	5	0
November .....	.....	.....	.....	37	17	8	0
December .....	.....	.....	.....	35	.....	.....	.....
Total	3	3527	.....	464	119	5	0

MINES REPORT.

MONTHLY STATEMENT FROM EACH GOLD DISTRICT.—Continued.

MONTH.	STORMONT.					UNPROCLAIMED AND OTHER DISTRICTS.								
	No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Yield of Gold.			No. of Mines.	Days' Labor.	No. of Men.	Tons Crushed.	Yield of Gold.		
					Oz.	Dwts.	Grs.					Oz.	Dwts.	Grs.
January	3	719	28	18	12	14	0	2	374	14	231	34	13	3
February	2	582	23	36	30	15	0	2	383	15	259	35	15	15
March	2	668	26	23	35	9	12	2	524	20	206	90	16	10
April	2	623	28	20	21	7	0	2	118	4	420	48	15	0
May	2	488	19	79	70	16	0	2	6	...	...	...	...	...
June	2	780	31	50	46	7	12	2	28	1	4	10	10	0
July	2	518	20	50	47	10	17	2	101	4	12	17	6	0
August	2	897	35	96	96	19	19	2	94	3	...	...	...	...
September	2	1243	49	129	127	4	0	2	0	...	...	...	...	...
October	3	1145	45	166	173	19	16	1	231	9	1	2	3	...
November	3	1059	42	133	229	9	0	1	210	8	16	4	6	2
December	3	929	37	29	64	12	0	1	375	15	250	116	15	0
Total.....	2	9651	...	829	957	3	4	2	2444	...	1399	361	0	4

GOLD.

GENERAL ANNUAL SUMMARY.

YEAR.	Total ounces of Gold extracted.			Stuff Crushed.	Yield per ton of 2000 lbs.			Total Days' Labor.	Average earnings per man per day and year, at 300 working days, \$18 per doz.	
	Oz.	Dwts.	Grs.		Oz.	Dwt.	Grs.		A Day.	A Year.
1862	7275	0	0	6473	1	2	11	156,000	\$0 83	\$249
1863	14001	14	17	17002		16	11	273,264	92	276
1864	20022	18	13	21434		18	16	252,720	1 42	426
1865	25454	4	8	24423	1	0	20	212,966	2 15	645
1866	25204	13	2	32162		15	2	211,796	2 14	642
1867	27314	11	11	31386		17	9	218,894	2 24	672
1868	20541	6	10	32262		12	17	241,462	1 53	459
1869	17868	0	19	35147		10	4	210,938	1 52	456
1870	19866	5	5	30829		12	21	173,680	2 05	615
1871	19227	7	4	30791		12	11	162,922	2 12	636
1872	13094	17	6	17093		15	7	112,476	2 09	627
1873	11852	7	19	17708		13	9	93,570	2 28	684
1874	9140	13	9	13844		13	5	77,246	2 12	636
1875	11208	14	19	14810		15	4	91,698	2 20	660
1876	12038	13	18	15490		15	13	111,304	1 94	582
1877	16882	6	1	17369		19	10	123,565	2 46	738
1878	12577	1	22	17990		13	23	110,422	2 05	615
1879	13801	8	10	15936		17	8	92,002	2 34	702
1880	13234	0	4	14037		18	20	103,826	2 18	654
1881	10756	13	2	15556		12	20	126,308	1 52	456
1882	14107	3	20	12081		12	18	106,884	2 37	711
1883	15446	9	23	25954		10	21	97,733	2 84	862
1884	16059	18	17	25147		12	18	118,087	2 40	720
1885	22202	12	20	28890		15	4	157,421	2 53	759
1886	23362	5	13	29010		16	2	128,880	3 25	975
1887	21211	17	18	22280		19	11	173,448	2 20	660
1888	22407	3	10	36178		15	21	163,772	2 46	738
1889	26155	6	13	39160		17	22	211,548	2 22	666
1890	24358	9	9	42749		11	9	160,164	2 73	719
1891	23391	..	..	35212		13	7	149,381	2 80	840
	530066	..	..	728403	.....			4,624,447	.....	.....

INTERCOLONIAL RAILWAY.

Statement showing the quantities in tons of the different kinds of Coal received from the various Mines for the use of the Intercolonial Railway during the year 1891.

MONTH.	SPRINGHILL.		ACADIA.					DRUMMOND.		JOGGINS	BLACK DIAMOND		EAST RIV- ER, PIC- TOU CO.		GARDNER.		INTERNATIONAL.	
	Round.	Slack.	Round.	R. of M.	Nut.	Slack.	Coke.	Round.	Slack.	Round.	Round.	Round.	Round.	Round.	Slack.	Round.	Slack.	
January.....	13890	206	5003	.....	35	132	....	4460	.....	5783	.....	.....	.....	.....	.....	1921	.....
February....	4286	77	2549	.....	.....	39	....	3706	.....	5092	.....	.....	.....	.....	.....	77	8
March.....	5684	190	4773	16	.....	6	....	3553	.....	2274	.....	1270	123	.....	.....	.....	.....
April.....	9536	516	4153	.....	.....	28	....	14	.....	1998	.....	910	372	.....	.....	.....	.....
May.....	10982	190	1984	.....	35	89	15	1060	.....	3354	.....	796	186	.....	.....	.....	.....
June.....	12734	262	2237	.....	.....	95	15	682	.....	1570	.....	626	204	.....	.....	.....	.....
July.....	7613	850	2263	.....	.....	30	....	565	.....	2838	.....	414	246	.....	.....	110	.....
August.....	12654	1258	2824	.....	.....	.....	....	257	.....	4623	.....	.....	276	.....	.....	176	.....
September....	7995	144	4891	.....	.....	70	....	555	.....	1724	.....	.....	149	.....	.....	226	.....
October.....	8876	848	4559	.....	.....	70	....	1105	.....	2690	.....	.....	.....	.....	90	439	.....
November....	8009	824	5279	.....	.....	112	13	2678	.....	4912	.....	.....	.....	.....	505	142	.....
December....	11131	1306	3881	.....	5	.....	....	2142	133	1968	.....	.....	.....	.....	270	258	10
																506	20	
	113390	6671	44396	16	75	671	43	20777	133	38826	4016	1556	865	10	3883	38		

INTERCOLONIAL RAILWAY.

Statement showing numbers of Tons of Coal received at the following Stations, from Mines in Nova Scotia, for year ending 31st December, 1891.

Stations.	No. of Tons.	Stations.	No. of Tons.
Halifax.....	39,934	Oxford Junction	6
Dartmouth	13,586	Oxford	772
Bedford	725	Pugwash Junction ..	12
Windsor Junction....	10,487	Pugwash	673
Wellington	124	Wallace ..	244
Enfield	365	Tatamagouche	231
Elmsdale	219	Denmark	65
Milford	54	River John	643
Shubenacadie	521	Scotsburn	389
Stewiacke	700	Scotch Hill	13
Brookfield	106	Pictou	10,043
Truro	10,533	River Phillip	30
Valley	28	Athol	12
Riversdale	12	Maccan	24
West River	36	Nappan	52
Glengarry	18	Amherst	8,309
Hopewell	2,007	Aulac	995
Eureka	113	Sackville	3,624
Riverton	17	Dorchester	653
Stellarton	12,274	Memramcook	157
Sylvester	65	Painsec Junction	6
Pictou Landing	66,108	Shediac	240
Trenton	640	Point du Chene	18
New Glasgow	34,725	Moncton	21,407
Woodburn	6	Salisbury	1,494
West Merigomish....	6	Petitcodiac	545
Merigomish	96	Penobsquis	12
Avondale	81	Sussex	384
James River	30	Apohaqui	12
Antigonish	2,125	Norton	82
South River	12	Bloomfield	12
Heatherton	45	Passekeag	6
Bayfield Road	89	Hampton	378
Tracadie	109	Rothsay	148
Harbour au Bouche..	66	Cold Brook	6,017
Mulgrave	1,241	St. John	31,101
Belmont	63	Harcourt	24
DeBert	22	Kent Junction	329
East Mines	24	Chatham Junction ..	2,639
Londonderry	56,082	Derby Junction	18
Folleigh	6	Millerton	12
Wentworth	24	Newcastle	55
Greenville	18	Gloucester Junction..	491

MINES REPORT.

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INTERCOLONIAL RAILWAY—Continued.

Stations.	No. of Tons.	Stations.	No. of Tons.
Bathurst	64	St. Eloi	18
Petite Roche	12	St. Arsene	28
Jacquet River	12	River du Loupe	2,546
New Mills	18	St. Charles	14
Charlo	6	St. Henri Junction ..	17,828
Dalhousie	16	Chaudiere Junction ..	67,329
Campbellton	36	Levis	35
Metapedia	378	Pt. Levis	6,538
Amqui	6	G. T. Ry., (Chaudiere	
Little Metis	6	Junction)	24,275
Ste. Flavie	18	C. P. Ry, (St. John) ..	7,663
Rimouski	18		
Trois Pistoles	69	Total	472,852

FORWARDED FROM	No. of Tons.
Maccan	10,041
Springhill	215,982
Stellarton	161,132
Westville	45,567
New Glasgow	40,130
Total	472,852

LONDONDERRY IRON MINES.

MEMO. OF LABOUR ETC., FOR YEAR 1891.

ORE.

	Men.	Day's Work.
Skilled workmen :—Underground	61	15,270
“ Above ground	30	8,948
Unskilled workmen :—“	51	11,069
“ Underground	46	10,951

LIMESTONE.

Skilled workmen	3
Unskilled workmen	12

Ore Mined	46,350	Tons.
Coke made	9,281	“
Limestone Quarried	10,651	“
Ore received from Springville	113	“
“ “ Bridgeville	680	“
“ “ Pugwash	214	“
“ “ Torbrook	7,273	“

MINES REPORT.

Statement of Articles, the Produce of the Mine, exported from the Port of Halifax, for the Year ended Dec. 31st, 1891.

ARTICLE.	THE PRODUCE OF CANADA.		NOT THE PRODUCE OF CANADA.		TOTAL EXPORTS.
Coal, Tons	31,722	\$ 97,136	2319	\$ 6,217	.....
Gypsum "	1,200	1,312	.....	.....	.....
Kerosene, Gals	585	104	5058	420	.....
Manganese	5	203	.....	.....	.....
Antimony	10	60	.....	.....	.....
Salt .....	.....	49	.....	12,694	.....
Other Articles .....	.....	.....	.....	.....	.....
Total .....	.....	\$ 98,864	.....	\$19,331	\$ 118,195
Gold .....	.....	290,650	.....	.....	290,650
Total .....	.....	\$389,514	.....	\$19,331	\$408,845

EXPORTS FROM AMHERST, YEAR 1891.

	Tons.	Value.
Coals	330	\$ 212 00
Building Stone	2548	12,665 00
Grindstones .....	.....	7,906 00
		\$20,783 00

LIMESTONE.

Brookfield	Tons	10,651
Bras d'Or Lime Co., "	"	7,896
" " Bbls	Bbls	39,912
Miscellaneous "	"	5,000

STONE, &C.

	Tons.	Value.
A. Seaman & Co.		
Lower Cove, Cumb. Co.—Stone	2,548	\$12,665 00
" " —Grindstones	1,960	19,600 00
Merigomish	180	2,000 00

